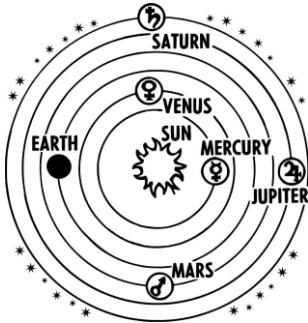


Name _____

Copernican Revolution - Student Worksheet

Post Renaissance Science - The Age of reason



Although most astronomers still believed the heavens rotated round the Earth until late Renaissance times, the idea that all planets might revolve around the Sun was first raised by the mathematician and astronomer Aristarchus of Samos (310-230BC).

When mathematicians and astronomers carefully measured the movements of the planets, they discovered that it was impossible to predict to where they might move to if they used the Earth as the centre of their orbits. Their progressive movements could only be explained if they moved round the Sun and we moved with them.

Nicolaus Copernicus (1473-1543) was a priest who used mathematical



measurements and models to assert that the Sun was at the center of the solar system. He wrote his famous paper "On the revolutions of the Heavenly Spheres" but it was only published towards the end of his life. Copernicus was threatened with torture but maintained his belief that the planets orbited the Sun and the

stars lay outside the Solar System.

Do you think you could have been as brave as Copernicus? _____

When he died he was buried with fourteen others in an unmarked grave under the floor of Fromberk cathedral. His ideas weren't commonly accepted for another two hundred years.

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Four hundred and seventy three years after Copernicus' death, some scientists, clerics and politicians wanted to erect a special granite memorial dedicated to "the man who turned the Universe inside out". They thought that a solitary tomb would be more acceptable for the great Polish national hero. But how could they find one grave amongst many under the floor of the Cathedral? They used a STEM approach.

Using STEM to Find the Body of Nicholas Copernicus

What do the letters in STEM stand for?

Why do you think that the planets Uranus and Neptune along with the dwarf planet Pluto are not present on the Copernican diagram on the previous page?

Geophysicists used ground penetrating radar to outline areas of disturbed soil lying under the tiles on the cathedral floor. This work was difficult because they had to pause for religious services as this was still a working cathedral. Why did they use geophysics first and not just start digging?

Archaeologists and priests excavated under the floor of the cathedral to check the possible sites. Digging in sandy areas was difficult. When the organ played, its vibrations would shake loose sand which would fall back collapsing excavation holes. They eventually found over 100 possible grave sites. Many had multiple bodies. Why do you think so many people were



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buried under the floor inside the church?

How did Copernicus get to be buried there?

They soon found the skull and parts of the skeleton of a seventy-year-old man. Copernicus had died at seventy years. Is this sufficient evidence to say these were the remains of Copernicus?

Police forensic pathologists examined the skull and used computer programs to make measurements of it. These were used by experts in forensic facial reconstruction to create a model of what the head and face of the person with this skull would have looked like. Their model displayed a broken nose, a scar into the bone above its left eye and the same facial features that could be seen in a portrait that Copernicus had drawn of himself. Is this sufficient evidence to say the body belonged to Copernicus?

DNA experts wanted to find descendants of Copernicus to match their DNA with his to be completely sure. Unfortunately Copernicus had no children. Priests and forensic pathologists then examined some of Copernicus own mathematical books, which were still held in a library. They found his hairs trapped between the pages. The DNA scientists compared the DNA from a tooth and a bone to find a perfect match with DNA from



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the hair. Is this sufficient evidence to say the body was Copernicus?

List the evidence which put together convincingly proved the skeleton and skull to be Copernicus?

Which STEM trained scientists were involved with solving the case? Place a X in the appropriate box

Expert's area	Science	Technology	Engineering	Mathematics

