

Geocentric Versus Heliocentric Story

Note: The orange sections are what the teacher reads as a narrator. The purple is what the children will be reading and what is contained on the [Geocentric Versus Heliocentric Characters Activity Sheet](#). The blue indicates the Activity Sheet you could use. The bold black refers to Lesson Presentation.

Solar System Story Map – Ancients 1

Teacher: For thousands of years people believed that the Earth was the centre of the solar system and indeed the universe! By observing the Sun during the day it seemed obvious that it was moving around the Earth.

Early humans: See! The Sun's moving across the sky, like it does every day!

Ancient Egyptian: We believed that the Sun was a God called Aten. When he rose in the east he was Khepri, when he was overhead he was Ra and when it set he was Atum!

Solar System Story Map – Ancients 2

Ancient Indians: The Ancient Indians were some of the earliest astronomers and we created calendars based on the sun and moon (360 days and 12 months - not too far off the actual number!).

Ancient Sumerian: We Ancient Sumerians knew a lot about planets but we weren't sure about how they moved. We thought they were all linked together somehow.

Solar System Story Map – Ancient Greeks

Teacher: It was the Ancient Greeks who really started to look into exactly how the planets moved. Aristotle was one of them.

Aristotle: I'm Aristotle. I believe that the Earth is the centre of the Universe and that all planets move around it. I think quite rightly that the Earth is a sphere and it has transparent spheres surrounding it. The planets are attached to those spheres and move along them. (Show [Aristotle's Planetary Model Activity Sheet](#)).

Teacher: Aristotle's ideas about how the planets moved were eventually displaced by a bright Greek scientist called Ptolemy.

Ptolemy: I'm Ptolemy. Well I agree with Aristotle about some ideas. I also think that the Earth is in the centre of the Universe. It has to be because half the stars are above us and half are below us. So if we weren't in the centre of the Universe then we would not see all of the stars. Now in my model (called the Ptolemaic Model after me!) it shows that the other planets and the Sun move around the Earth in circles but also move in a circle on the circle as well. I know that's a bit complicated but you see it explains why the planets seem closer sometimes and further away at other times. Simple – great I managed to clear all that up! (Show [Ptolemy's Planetary Model Activity Sheet](#)).

Teacher: Ptolemy's model became the accepted view for hundreds of years. However, during the time of the Islamic Golden Age, some scholars started to criticise his model. Alhazen was the first to outright disagree with the Ptolemaic Model.

Solar System Story Map – Islamic Scholars

Alhazen: I'm Alhazen. Well I do think that the Earth is at the centre – don't get me wrong but the planets simply can't move the way Ptolemy says. It doesn't make sense mathematically.

Teacher: Other Islamic Scholars from the Maharaga School toyed with the idea of Heliocentrism.

al-Katibi: I'm al-Katibi. I thought the Sun was the centre of the universe but I didn't really have the evidence so I went back to the geocentric model.

Tusi: I'm Tusi. I studied the planets a lot! I created the 'Tusi couple' which shows how planets can rotate and orbit at the same time. I wasn't entirely convinced that the Earth did though. (Show [Tusi's Couple Model Activity Sheet](#)).

Teacher: Tusi work influenced the first real scientist to propose the Heliocentric Model – Copernicus.

Solar System Story Map – Changing Europe

Copernicus: I'm Copernicus. I just didn't think Ptolemy's ideas about how the planets moved made sense!! It seemed that sometimes the planets looked like they were going backwards. I realised that it only made sense if the Earth was orbiting the Sun and so were the other planets. If the Earth was moving faster than the planet on its orbit then it makes sense that it might look like it's going backwards to us here on Earth.

Basically I used the 'Tusi Couple' idea to help me form a new idea about how the planets move. I think:

The Sun is not the centre of the universe but that it orbits around a point that is.

The moon orbits the Earth but the Earth orbits the Sun like all the other planets.

The Sun looks like it's moving to us but actually it is the Earth that is rotating that makes this appear true.

(Show [Copernicus's Planetary Model Activity Sheet](#)).

Teacher: In Europe, most people followed the Catholic Church and they accepted the Ptolemaic model. Copernicus did not try to publish his work straight away because he feared the criticism he might receive. He did eventually publish his book but it was the same year that he died. His ideas were not accepted straight away and some objected. This was because there is a passage in the Bible which seems to suggest that the Earth is stable and that it doesn't move. However, at first there was little controversy. Copernicus's ideas did not cause a huge fuss and were not totally accepted.

Tycho Brahe: I'm Tycho Brahe. I didn't like the idea that the Earth moved around the Sun – so I invented a model where some planets do go round the Sun except for Earth. The Sun and Moon go round the Earth in my model. (Show [Tycho Brahe's Planetary Model Activity Sheet](#)).

Teacher: While many did not like Tycho's ideas the invention of the telescope was about to change all manner of things in Astronomy. Firstly, it was used to prove that Mars did orbit the Sun. This made some agree with Tycho's model. It wasn't until a particularly plucky Italian called Galileo came along that Copernicus' ideas started to gain evidence and members of the Church started to see Heliocentrism as dangerous.

Galileo: I'm Galileo Galilei Well I have to say that telescope is brilliant!! But the fact that I used it to look at space (the heavens as we call it) and my observations brought me into dispute with the Church in Italy. Here's the thing – until I started to observe planets with my telescope they were only used on land. I spent a long time observing Jupiter and it's moons. I found that the moons were definitely orbiting Jupiter and not the Earth – therefore it made sense to me that Copernicus was right.

I did not disagree with the Church but thought that the bible was not talking about the actual movement of the Earth.

Unfortunately, when the Church found out they put me on trial, found me guilty of using a telescope to

observe the universe (they had only been used on land until then) and saying the bible was not true. They made me recant my ideas (this involved me having to say that what I had found was not true). It wasn't hundreds of years after my death that the Church admitted it was wrong and that I should not have been found guilty. I had to live under house arrest for the rest of my life.

Teacher: While the Church was able to prevent Galileo from pursuing his ideas, this did not stop people in other countries using his findings to support Copernicus' model and build on it. Ideas were changing to a heliocentric model, based on evidence from better and more powerful telescopes.

Solar System Story Map – Heliocentric Model

Kepler: I am Johannes Kepler. I was the first person to create an actual model and try to explain how the heliocentric system worked. More importantly I stated that the Sun was definitely the centre around which the planets orbited. I came up with the laws of how the planets moved. (Show [Kepler's Planetary Model Activity Sheet](#)).

Newton: I'm Isaac Newton. It was obvious by the time I was writing my works that the only idea that made sense was that the solar system was heliocentric. I supported Kepler's work with my own ideas of gravity which help explain why the planets stay in their orbits as they do.

Teacher: By the time Newton published his books explaining how gravity affected the planets, the Church had to change its mind. It stopped banning books about heliocentrism and finally accepted that the Earth moved not just in one but two ways – rotating and orbiting.

That brings us all the way to today where we believe nothing but the heliocentric model. What this story shows is that ideas in science do change over time but big discoveries can often take a long time to be accepted and proven.