

Chapter 1 Summary

The evidence of our senses is that the earth is unmoving and the rest of universe revolves around it. One of the achievements of astronomy is proving that this is not true.

The night sky above us looks like a giant dome. The zenith is the point on the sky directly above us and the horizon is where the sky meets the earth. The sky rotates around an axis anchored with a north celestial pole near Polaris, the north star, and south celestial pole. The celestial equator is midway between these two points. You can see only some of the sky and your view depends where you are on the earth and the date and time. The day sky is dominated by the sun which gradually moves across the sky. Its path is called the ecliptic which is inclined by about 23° from the celestial equator. The sun takes one year to make a full circuit around the sky.

There are two sorts of star-like objects in the sky. The planets are those that move around the sky. Their path is along the ecliptic. The stars themselves are fixed. Humans group them into patterns called constellations which are used today to make a map of the sky.

The study of astronomy extends back into pre-history. The ancient Greeks were responsible for many of the early discoveries. They knew the earth is a sphere from observations of the moon's phases, lunar eclipses, and the changing view of the sky as one moved away from Greece. They tried to measure the distance to the stars by using parallax, how near objects move on a background when viewed from different locations, but they could observe none. Ptolemy, in the 2nd century, made accurate observations of the planets and developed a geocentric, earth centered, model of the universe. He introduced epicycles into the motion of some of the planets to explain their retrograde motion. Copernicus in the early 16th century noted errors in Ptolemy's model and proposed a heliocentric, sun centered, model that corrected the problems. Galileo in the early 17th century made observations with the telescope that contradicted the geocentric model. He saw the moons of Jupiter, things in the universe that were not rotating around the earth, the phases of Venus, not explainable in the geocentric model but clearly a prediction of the heliocentric model, and earth-like features on the moon, which indicated that there was nothing special about the heavenly bodies. These observations confirmed Copernicus' heliocentric model.