Astrophysics is a science that employs the methods and principles of physics and chemistry in the study of astronomical objects and phenomena. As one of the founders of the discipline said, Astrophysics "seeks to ascertain the nature of the heavenly bodies, rather than their positions or motions in space–what they are, rather than where they are." Among the subjects studied are the Sun, other stars, galaxies, extrasolar planets, the interstellar medium and the cosmic microwave background. Emissions from these objects are examined across all parts of the electromagnetic spectrum, and the properties examined include luminosity, density, temperature, and chemical composition. Because astrophysics is a very broad subject, astrophysicists apply concepts and methods from many disciplines of physics and chemistry, including classical mechanics, electromagnetism, statistical mechanics, thermodynamics, quantum mechanics, relativity, nuclear and particle physics, and atomic and molecular physics.

Hubble's law, also known as the Hubble–Lemaître law or Lemaître's law, is the observation in physical cosmology that galaxies are moving away from Earth at speeds proportional to their distance. In other words, the farther they are the faster they are moving away from Earth. The velocity of the galaxies has been determined by their redshift, a shift of the light they emit toward the red end of the visible

Dark matter is a**hypothetical form of matter thought to account for approximately 85% of the matter in the universe**. Dark matter is called "dark" because it does not appear to interact with the electromagnetic field, which means it does not absorb, reflect, or emit electromagnetic radiation (like light) and is, therefore, difficult to detect.

A black hole is a place in space where gravity pulls so much that even light can not get out. The gravity is so strong because matter has been squeezed into a tiny space. This can happen when a star is dying.

Because no light can get out, people can't see black holes. They are invisible. Space telescopes with special tools can help find black holes. The special tools can see how stars that are very close to black holes act differently than other stars.

A wormhole (or Einstein–Rosen bridge or Einstein–Rosen wormhole) is a speculative structure linking disparate points in spacetime, and is based on a special solution of the Einstein field equations.