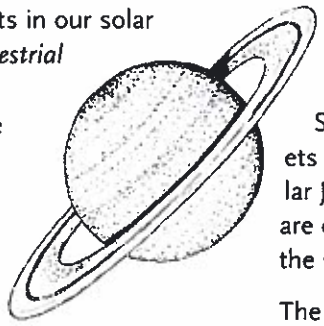
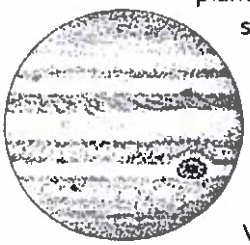
Planet Resource-1

Research Reading: Terrestrial and Jovian Planets



With the exception of Pluto, planets in our solar system are classified as either *terrestrial* (Earth-like) or *Jovian* (Jupiter-like) planets. Terrestrial planets include Mercury, Venus, Earth, and Mars. These planets are relatively small in size and in mass. A terrestrial planet has a solid rocky surface, with metals deep in its interior. In the solar system, these planets are closer to the sun and are therefore warmer than the planets located farther out in the solar system. Future space missions are being designed to search remotely for terrestrial planets around other stars.



The layers of gases surrounding the surface of a planet make up what is known as an atmosphere. The atmospheres of the terrestrial planets range from thin to thick. Mercury has almost no atmosphere. A thick atmosphere made mostly of carbon dioxide covers Venus, trapping heat and raising surface temperatures. Clouds on Venus form from sulfuric acid. Earth's atmosphere is 77 percent nitrogen, 21 percent oxygen, and 1 percent argon, with variable amounts of water vapor, and trace amounts of other gases. White clouds of water vapor hide much of Earth's surface in views of Earth from space. Mars has a very thin atmosphere containing mostly carbon dioxide, with nitrogen, argon, and trace amounts of oxygen and water vapor. The atmosphere also contains thin water and carbon dioxide clouds, and is frequently affected by dust storms.

Jovian planets include Jupiter, Saturn, Uranus, and Neptune. These planets have larger sizes and masses. Jovian planets do not have solid surfaces. They are sometimes called gas giants because they are large and made mostly of gases. Small amounts of rocky materials are only found deep in the cores of Jovian planets. In the solar system, Jovian planets are located farther from the sun than terrestrial planets, and are therefore cooler. Scientists have found more than 100 Jovian planets around other stars. The majority of the extrasolar Jovian planets that have been discovered so far are closer to their stars than the Jovian planets in the solar system are to the sun.

The atmospheres of the Jovian planets in our solar system are made mostly of hydrogen and helium. Compounds containing hydrogen, such as water, ammonia, and methane, are also present. Differences in the amounts of these trace gases and variations in the temperatures of these planets contribute to the different colors seen in images taken in visible light. While scientists expect the atmospheres of Jovian planets in other solar systems to be composed mainly of hydrogen and helium, they have not yet measured the properties of their atmospheres.

Pluto, the most remote planet in our solar system, might be little more than a giant comet. Pluto resembles the icy, comet-like objects orbiting the Sun outside of Neptune's orbit, rather than either the rocky terrestrial planets or the Jovian planets. Factors that distinguish Pluto from the terrestrial and Jovian planets include its composition (ice, rock, and frozen gases), changing atmosphere, small size, comparatively large moon, and its elliptical orbit around the Sun.

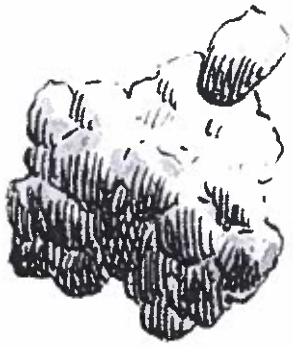
Planet Resource-2

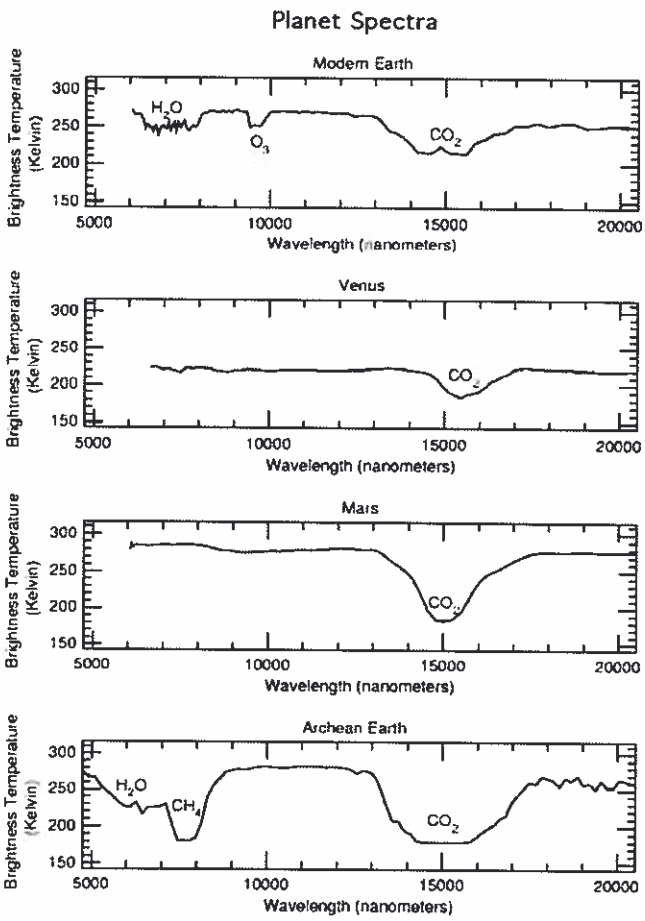
Planet Spectra

The planet spectra data shown here represent the infrared portion of the electromagnetic spectrum, where planets re-emit the energy absorbed from their parent star. The dips in the curve result when gases in the planet's atmosphere absorb certain wavelengths of energy. Because every element and compound has a characteristic pattern of absorption, the location of these absorption bands allow scientists to identify the element or compound in the atmosphere that is absorbing the energy.

Except for Archean Earth, these graphs represent real satellite data. The Archean Earth spectrum represents a scientific model of Earth's atmosphere based on what is known about this time in Earth's history and what is understood about modern planetary atmospheres.

The major absorption bands on each planet's spectrum have been labeled with the compound(s) responsible for the absorption.





What Is Brightness Temperature?
Scientists often plot brightness temperature instead of intensity because the spectral features caused by atmospheric composition are more easily seen when plotted this way. Brightness temperature is the temperature an object must have to produce the observed intensity.