WHAT IS ELECTROMAGNETIC RADIATION?

Electromagnetic radiation is any form of energy that travels through space or a medium in the form of waves. Waves are a way to think about the energy that is being transmitted. Just like waves in a lake, light is also a wave. But instead of being carried by water molecules, light is carried by photons. Photons are the smallest unit of electromagnetic radiation. Electromagnetic radiation consists of waves that travel through space. These waves have different properties, such as frequency and wavelength, which determine the type of radiation. Since all light waves are made up of photons, they all carry the same energy. But the energy is not necessarily contained in all parts of the wave. For example, visible light contains a lot of energy, but it is also a very small wavelength, so it will be much less intense than infrared light. The shorter the wavelength, the more energetic the electromagnetic radiation. Radio waves, including microwaves, have long wavelengths and therefore low energy. Visible light, ultraviolet, and X-rays have much shorter wavelengths and therefore higher energy. Gamma rays have the shortest wavelengths and therefore the highest energy.

WHAT IS REFLECTANCE SPECTROSCOPY?

Spectroscopy is the study of the electromagnetic radiation emitted, absorbed, or reflected by an object. Reflectance spectroscopy is a type of spectroscopy where the object is illuminated with electromagnetic radiation and the radiation reflected by the object is measured. The electromagnetic radiation is often a form of light, but it can also be other forms of radiation, such as X-rays or gamma rays. Reflectance spectroscopy is often used to identify the minerals and materials in an object. This is done by comparing the spectrum of the reflected radiation to a database of known spectra. The database contains a large number of spectra, each of which is associated with a specific mineral or material. The spectrum of the object is compared to the spectra in the database to determine which minerals or materials are present in the object.

HOW DO SCIENTISTS DETERMINE THE COMPOSITION OF ROCKS THEY CAN'T TOUCH?

Our eyes are built to detect visible electromagnetic radiation, which is the part of the spectrum we see. However, there are many other parts of the spectrum that are invisible to our eyes. For example, X-rays, ultraviolet light, and infrared radiation are invisible to our eyes but can be detected by other instruments. These instruments can be used to study the composition of rocks and minerals that are not accessible to humans. For example, X-ray diffraction can be used to study the structure of minerals in a rock, while infrared spectroscopy can be used to study the chemical composition of a rock.

SPECTROMETERS IN ACTION AROUND THE MOON

Great successes are achieved in space when a spacecraft is able to see something that is not visible to our eyes. The images of the Moon taken by the Lunar Reconnaissance Orbiter are examples of this. These images are taken using a special kind of camera called a spectrometer. A spectrometer is a device that can be used to detect and measure the amount of light that is reflected from a surface. This information can be used to study the composition of the surface. The spectrometer can be used to detect the presence of different minerals and materials in the surface. By comparing the spectra of the reflected light to a database of known spectra, the spectrometer can determine what minerals and materials are present in the surface.

EXPLORATION TIMELINE

The Apollo samples brought back to Earth were the first to be analyzed, and they revealed the presence of water. The lunar mare samples were analyzed to determine the composition of the surface. The samples were analyzed using a variety of techniques, including micro-X-ray fluorescence, and provided the first detailed information about the composition of the lunar surface. The Apollo samples also revealed the presence of water, and provided the first evidence of the existence of water on the Moon. The lunar samples were analyzed to determine the composition of the surface. The samples were analyzed using a variety of techniques, including micro-X-ray fluorescence, and provided the first detailed information about the composition of the lunar surface. The Apollo samples also revealed the presence of water, and provided the first evidence of the existence of water on the Moon. The lunar samples were analyzed to determine the composition of the surface. The samples were analyzed using a variety of techniques, including micro-X-ray fluorescence, and provided the first detailed information about the composition of the lunar surface. The Apollo samples also revealed the presence of water, and provided the first evidence of the existence of water on the Moon. The lunar samples were analyzed to determine the composition of the surface. The samples were analyzed using a variety of techniques, including micro-X-ray fluorescence, and provided the first detailed information about the composition of the lunar surface. The Apollo samples also revealed the presence of water, and provided the first evidence of the existence of water on the Moon. The lunar samples were analyzed to determine the composition of the surface. The samples were analyzed using a variety of techniques, including micro-X-ray fluorescence, and provided the first detailed information about the composition of the lunar surface. The Apollo samples also revealed the presence of water, and provided the first evidence of the existence of water on the Moon. The lunar samples were analyzed to determine the composition of the surface. The samples were analyzed using a variety of techniques, including micro-X-ray fluorescence, and provided the first detailed information about the composition of the lunar surface. The Apollo samples also revealed the presence of water, and provided the first evidence of the existence of water on the Moon. The lunar samples were analyzed to determine the composition of the surface. The samples were analyzed using a variety of techniques, including micro-X-ray fluorescence, and provided the first detailed information about the composition of the lunar surface. The Apollo samples also revealed the presence of water, and provided the first evidence of the existence of water on the Moon. The lunar samples were analyzed to determine the composition of the surface. The samples were analyzed using a variety of techniques, including micro-X-ray fluorescence, and provided the first detailed information about the composition of the lunar surface. The Apollo samples also revealed the presence of water, and provided the first evidence of the existence of water on the Moon. The lunar samples were analyzed to determine the composition of the surface. The samples were analyzed using a variety of techniques, including micro-X-ray fluorescence, and provided the first detailed information about the composition of the lunar surface. The Apollo samples also revealed the presence of water, and provided the first evidence of the existence of water on the Moon.