Electromagnetic waves transfer energy

All types of waves, whether they are mechanical or electromagnetic or are longitudinal or transverse, have an energy associated with their motion. In the case of electromagnetic waves, that energy is stored in the oscillating electric and magnetic fields.

The simplest definition of energy is the capacity to do work. When work is performed on a body, a force moves the body in the direction of the force. The force that electromagnetic fields exert on a charged particle is proportional to the electric field strength, E, and the magnetic field strength, B. So, we can say that energy is stored in electric and magnetic fields in much the same way that energy is stored in gravitational fields.

The energy transported by electromagnetic waves is called **electromagnetic radiation.** The energy carried by electromagnetic waves can be transferred to objects in the path of the waves or converted to other forms, such as heat. An everyday example is the use of the energy from microwave radiation to warm food. Energy from the sun reaches Earth via electromagnetic radiation across a variety of wavelengths. Some of these wavelengths are illustrated in **Figure 21.**

electromagnetic radiation

the transfer of energy associated with an electric and magnetic field; it varies periodically and travels at the speed of light

Figure 21
The sun radiates in all parts of the electromagnetic spectrum, not just in the visible light that we are accustomed to observing. These images show what the sun would look like if we could "see" at different wavelengths of electromagnetic radiation.