An Energy Chart

The electromagnetic spectrum is a chart that shows many different types of energy arranged according to their wavelength.

There are many kinds of electromagnetic waves. Each kind vibrates at a different wavelength and frequency. (Remember that wavelength refers to the distance from one crest or trough to the next. Frequency refers to the number of waves that pass a point in one second.) As you go from left to right on the spectrum shown above, wavelength increases and frequency decreases. Some waves, such as the waves that carry radio and television signals, are long, while others, such as x-rays and ultraviolet rays from the sun, are very short. Other types of electromagnetic waves include gamma waves, infrared waves, light waves, and microwaves. The only electromagnetic waves we can see are light or visible waves.

Shorter, high-energy waves such as x-rays can be harmful to people if used improperly. However, when used correctly and in short exposure times, these rays can improve and even save lives. For example, gamma rays from radioactive cobalt are used to kill cancer cells. Doctors use x-rays to "photograph" parts of the body such as teeth and potentially broken bones. Ultraviolet rays have been used to sterilize objects and kill certain kinds of bacteria.

Complete the following sentences by circling the correct phrase.

1. The waves shown on the electromagnetic spectrum vibrate (at one speed / at different speeds).

2. The waves shown on the right of the electromagnetic spectrum above vibrate (more quickly / more slowly) than the waves on the left.

3. In each pair below, circle the waves that vibrate faster.
   a. gamma rays or radio waves   b. infrared rays or ultraviolet rays
   c. ultraviolet rays or x-rays   d. visible light or radio waves

4. List the colors of the visible spectrum according to wavelength from longest to shortest.
   a.  
   b.  
   c.  
   d.  
   e.  
   f.  
   g.  

© 2002 McDONALD PUBLISHING CO.