

Types of Waves

All waves transfer energy by repeated vibrations. However, waves can differ in many ways. Waves can be classified based on the direction in which the particles of the medium vibrate compared with the direction in which the waves move. The two main types of waves are *transverse waves* and *longitudinal waves*. (LAHN juh TOOD'n uhl) Sometimes, a transverse wave and a longitudinal wave can combine to form another kind of wave called a *surface wave*.

Transverse Waves

Waves in which the particles vibrate in an up-and-down motion are called **transverse waves**. *Transverse* means "moving across." The particles in this kind of wave move across, or perpendicularly to, the direction that the wave is going. To be *perpendicular* means to be "at right angles."

A wave moving on a rope is an example of a transverse wave. In **Figure 5**, you can see that the points along the rope vibrate perpendicularly to the direction the wave is going. The highest point of a transverse wave is called a *crest*, and the lowest point between each crest is called a *trough* (TRAWF). Although electromagnetic waves do not travel by vibrating particles in a medium, all electromagnetic waves are considered transverse waves. The reason is that the waves are made of vibrations that are perpendicular to the direction of motion.

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transverse wave a wave in which the particles of the medium move perpendicularly to the direction the wave is traveling

Figure 5 Motion of a Transverse Wave

A wave on a rope is a transverse wave because the particles of the medium vibrate perpendicularly to the direction the wave moves.

