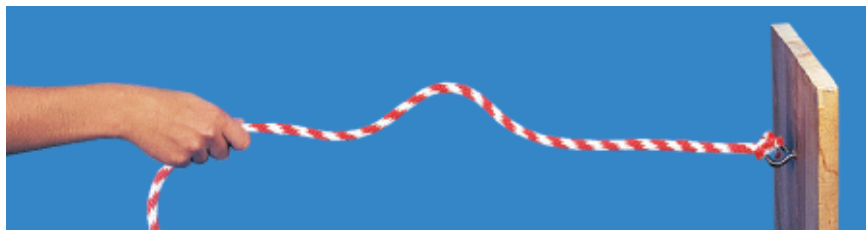


## WAVE TYPES

One of the simplest ways to demonstrate wave motion is to flip one end of a taut rope whose opposite end is fixed, as shown in **Figure 9**. The flip of your wrist creates a pulse that travels to the fixed end with a definite speed. A wave that consists of a single traveling pulse is called a *pulse wave*.



**Figure 9**

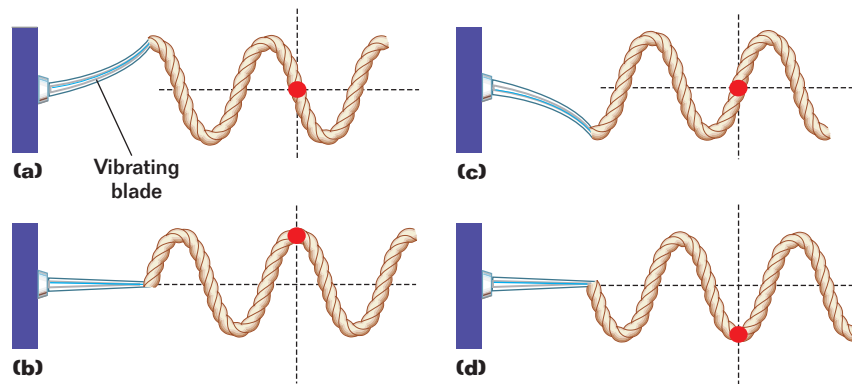
A single flip of the wrist creates a pulse wave on a taut rope.

Now imagine that you continue to generate pulses at one end of the rope. Together, these pulses form what is called a *periodic wave*. Whenever the source of a wave's motion is a periodic motion, such as the motion of your hand moving up and down repeatedly, a periodic wave is produced.

### Sine waves describe particles vibrating with simple harmonic motion

**Figure 10** depicts a blade that vibrates with simple harmonic motion and thus makes a periodic wave on a string. As the wave travels to the right, any single point on the string vibrates up and down. Because the blade is vibrating with simple harmonic motion, the vibration of each point of the string is also simple harmonic. A wave whose source vibrates with simple harmonic motion is called a *sine wave*. Thus, a sine wave is a special case of a periodic wave in which the periodic motion is simple harmonic. The wave in **Figure 10** is called a sine wave because a graph of the trigonometric function  $y = \sin x$  produces this curve when plotted.

A close look at a single point on the string illustrated in **Figure 10** shows that its motion resembles the motion of a mass hanging from a vibrating spring. As the wave travels to the right, the point vibrates around its equilibrium position with simple harmonic motion. This relationship between simple harmonic motion and wave motion enables us to use some of the terms and concepts from simple harmonic motion in our study of wave motion.



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**Figure 10**

As the sine wave created by this vibrating blade travels to the right, a single point on the string vibrates up and down with simple harmonic motion.