Name _____ Date _____ Class _____

SECTION 1-2 **SECTION SUMMARY**

Properties of Waves

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Guide for Reading

- **What are the basic properties of waves?**
- **How is a wave's speed related to its wavelength and frequency?**

There are many different kinds of waves. However, all waves share certain properties. **The basic properties of waves are amplitude, wavelength, frequency, and speed.**

To draw transverse waves, think of a rope. The horizontal line the straight rope makes before it is disturbed is the rest position. As the wave passes, the rope goes above or below the rest position. The crests and troughs are the highest and lowest points on the wave.

To draw longitudinal waves, think of the compressions in a spring toy as being similar to the crests of a transverse wave. The rarefactions in the spring toy are like the troughs of a transverse wave. By treating compressions as crests and rarefactions as troughs, you can draw longitudinal waves in the same way as transverse waves.

Amplitude is the maximum distance the medium carrying the wave moves away from its rest position. You can find the amplitude of a transverse wave by measuring the distance from the rest position to a crest or to a trough. The amplitude of a longitudinal wave is a measure of how compressed or rarefied the medium becomes. Very crowded compressions and very uncrowded rarefactions are like high crests and low troughs. These conditions would make a longitudinal wave with a large amplitude.

The distance between two troughs or two crests of a transverse wave is the **wavelength.** You can find the wavelength of a longitudinal wave by measuring the distance from one compression to the next compression (or from the beginning of one rarefaction to the beginning of the next rarefaction).

The **frequency** of a wave is the number of complete waves that pass a given point in a certain amount of time. Frequency can also be described as the number of vibrations per second. Frequency is measured in units called **hertz (Hz).** A wave or vibration that occurs every second has a frequency of 1 Hz.

The speed, frequency, and wavelength of a wave are related to each other by mathematical formulas.

$$Speed = Wavelength \times Frequency$$

$$Frequency = \frac{Speed}{Wavelength}$$

$$Wavelength = \frac{Speed}{Frequency}$$