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A sound wave is created when air particles (molecules) move back and forth. Simple sound waves are called sine waves. Sound waves vary in three respects: frequency, amplitude and complexity. Our psychological ‘ experience of pitch, loudness and timbre depend upon these physical characteristics of the sound waves.

(1) Frequency and Pitch:

With reference to audition, the term frequency refers to the rate of vibrations. It refers to the number of limes per second that the whole wave is repeated. If a sound wave is repeated 400 limes per second, its frequency is said to be 400 cycles.

Sound wave frequencies are generally measured in cycles per second. One cycle per second, also referred to as one Hertz (Hz), represents the sequence of compression to decompression to compression. Frequencies produces the sound sensation known as pitch. The higher the frequency, the higher is the pitch, the lower the frequency, the lower is the pitch. However, the increase in frequency by a certain amount does not increase the experience of pitch by the same amount.

(2) Amplitude and Loudness:

Amplitude refers to the strength or intensity of the wave. It refers to the amount of compression and expansion air molecules have undergoes. The height of the peaks of the sine wave represents amplitude. Amplitude gives us the psychological experience of loudness.

When the source of a sound wave undergoes intense vibration, the amplitude of the wave is high and we experience a loud sound. When the sound vibrates less intensely, the wave's amplitude is lower and the sound is fainter. The loudness or amplitude of sound is measured in terms of decibels.

(3) Complexity and Timber:

Timber refers to the purity or quality of a tone. Most of the sounds that we hear are complex sounds. The complexity of a sound is experienced psychologically as timber or lone quality.

Because of wave complexity or timber, we are able to identify the same musical note when it is played on different instruments. Complex waves are of different types. They can be periodic or a periodic waves.

Sound wave produced by musical instruments is generally periodic waves. A-periodic waves are referred to as noise in common language. These waves differ in frequency and amplitude in a random order.