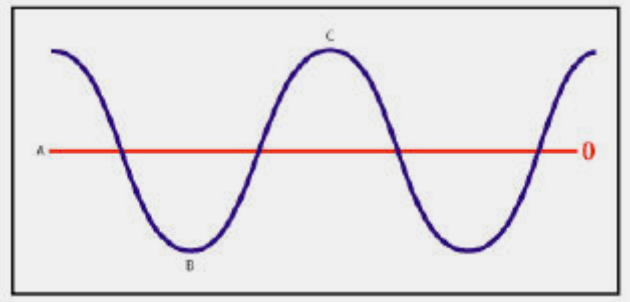
What is Digital Audio?

Digital audio is the representation of an audio signal by means of numbers, usually in binary format (ones and zeroes). Digital audio also refers to using computers to record, manage, and play audio stored in a digital format. Audio can be expressed visually in waveforms, as shown in **Figure 1**. The high and low points on the curve

Figure 1 – Sound Wave



represent changes in **amplitude**. We should be familiar with the term **frequency**. Sound frequency is the number of times per second a sound occurs, measured in Hertz (Hz). When audio is digitized the waveform is **sampled**, or broken up into individual units. CD's, for example, have a sample rate of 44,100 times per second. The loudness of sound is represented in **decibels**. Uncompressed sound wave (or WAV) files are very large. A One-minute WAV file might contain 10 MB of sound. If you wish to upload sound files to your website you should first compress the WAV files as **MP3** files, which are highly compressed yet maintain much of the quality of the uncompressed files. Sometimes audio is **streamed** over the Web, which means that it begins to play before the entire file is downloaded to the listener's computer. Another important audio term is **codec**, which refers to software that compresses audio files.

Common audio file formats:

- AIFF – Audio Interchange Format File. Uncompressed audio format for Apple computers.

- CDA – CD audio tracks. This is an uncompressed format.
- MP3 – The most popular format for downloading and storing music.
- OGG – A free, open source format.
- RA – Real Audio format used for streaming audio over the Internet.
- WAV – Uncompressed audio format for Windows computers.

Hardware and Software Needed for Recording, Editing, and Playing Digital Audio

If you wish to work with digital audio you will need as a minimum the following hardware:

- Computer with a sound card and speakers
- An inexpensive microphone, which may be purchased for $30 or less
- A headset microphone if you wish to record higher-quality sound

Software needed:

- A free or inexpensive sound recording and editing program such as Audacity or Garageband
- The free LAME MP3 encoder for Audacity
- An audio player for your computer such as Windows Media Player or the QuickTime player