

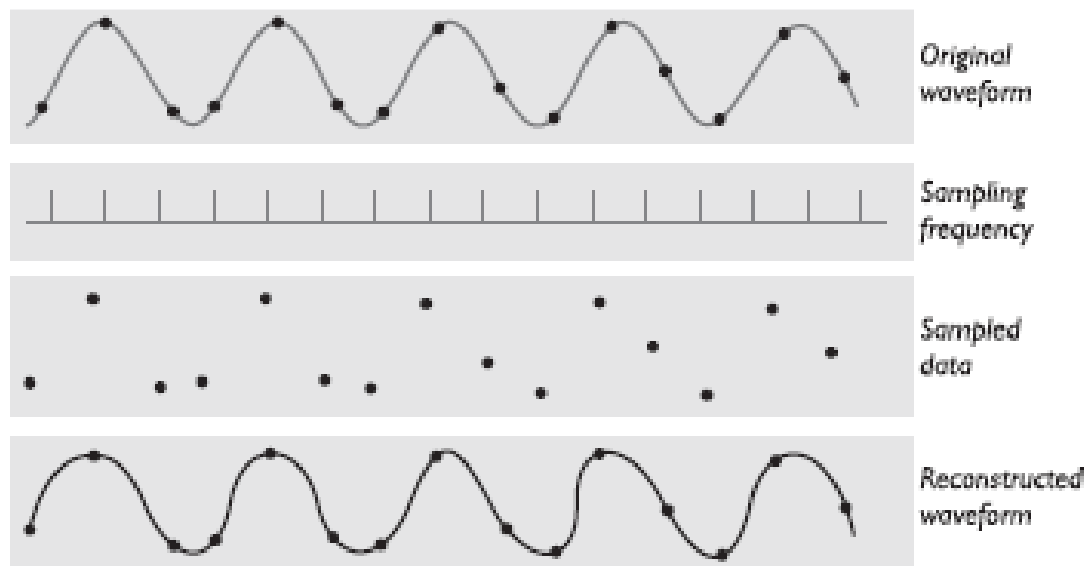
Digital Audio with Youtube Links

<https://www.youtube.com/watch?v=h4Zz2w7ILfU>

<https://www.youtube.com/watch?v=zC5KFnSUPNo>

- **Digital audio** is created when you represent the characteristics of a sound wave using numbers—a process referred to as digitizing.
- You can digitize sound from a microphone, a synthesizer, existing recordings, live radio and television broadcasts, and popular CD and DVDs or from any natural or prerecorded source.
- Digitized sound is sampled sound. Every n th fraction of a second, a **sample** of sound is taken and stored as digital information in bits and bytes.
- The quality of this digital recording depends upon how often the samples are taken (**sampling rate** or frequency, measured in kilohertz, or thousands of samples per second) and how many numbers are used to represent the value of each sample (**bit depth, sample size, resolution, or dynamic range**).
- The more often you take a sample and the more data you store about that sample, the finer the resolution and quality of the captured sound when it is played back.
- Since the quality of your audio is based on the quality of your recording and not the device on which your end user will play the audio, digital audio is said to be **device independent**.
- The three sampling rates most often used in multimedia are 44.1 kHz (**CD-quality**), 22.05 kHz, and 11.025 kHz.

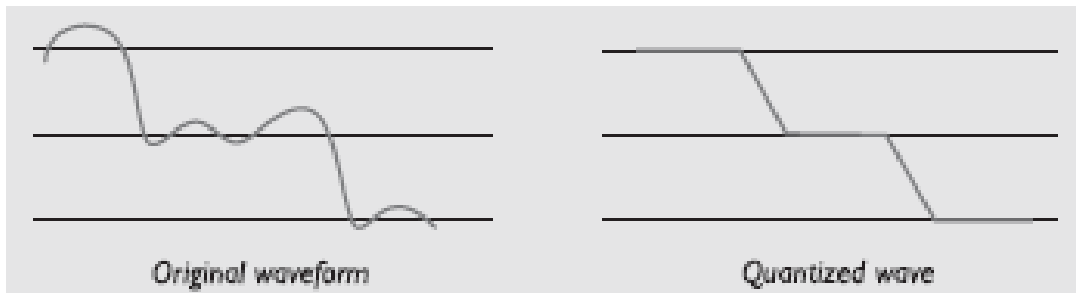
- Sample sizes are either 8 bits or 16 bits.
- The larger the sample size, the more accurately the data will describe the recorded sound. An 8-bit sample size provides 256 equal measurement units to describe the level and frequency of the sound in that slice of time.
- A 16-bit sample size, on the other hand, provides a staggering 65,536 equal units to describe the sound in that same slice of time frequencies, and each discrete sample is then stored either as 8 bits or 16 bits (or more) of data.



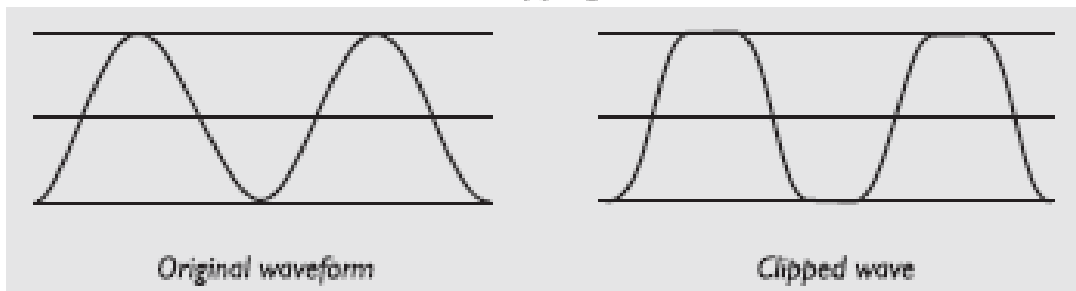
The value of each sample is rounded off to the nearest integer, This is called **quantization**.

and if the amplitude is greater than the intervals available, clipping of the top and bottom of the wave occurs.

Quantizing



Clipping



Quantization can produce an unwanted background hissing noise, and clipping may severely distort the sound.