

### 3.8.1.1: Wave Shape

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An **oscilloscope** is an electronic device that allows us to capture the shape of a sound wave coming from a microphone. The microphone turns the sound waves into an analog electric current which varies in voltage the same way the sound wave does in pressure. The oscilloscope shows the voltage on a screen. Although the sound wave is longitudinal (back and forth) the voltage is plotted vertically (transverse). The variations in voltage are actually too fast to see if they were plotted in real time. However, if the variations are periodic (repeat over time) the oscilloscope can make these variations visible by repeatedly plotting the same variation over and over on the screen. Some oscilloscopes can also capture a short, rapidly changing sound by taking a time snapshot of the sound. Note that oscilloscope pictures are *time graphs* of the sound wave; the oscilloscope does not show the space picture of the wave.

#### Video/audio examples:

- Oscilloscope used to capture [sound waves from a whistle](#).
- Oscilloscope showing [sound waves changing in amplitude and then frequency](#).
- Oscilloscope showing [different frequencies of a guitar](#).
- There are also smart phone apps that will show the shape of a sound wave in real time (for example [SignalScope](#) or oScope for the iPhone or SpecScope for Android).
- There are other, more artistic ways to visualize sound as shown in this [sound waves art exhibit](#). In this exhibit sound waves drive the motion of tiny styrofoam balls. Why do they form into the shapes that you see?

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