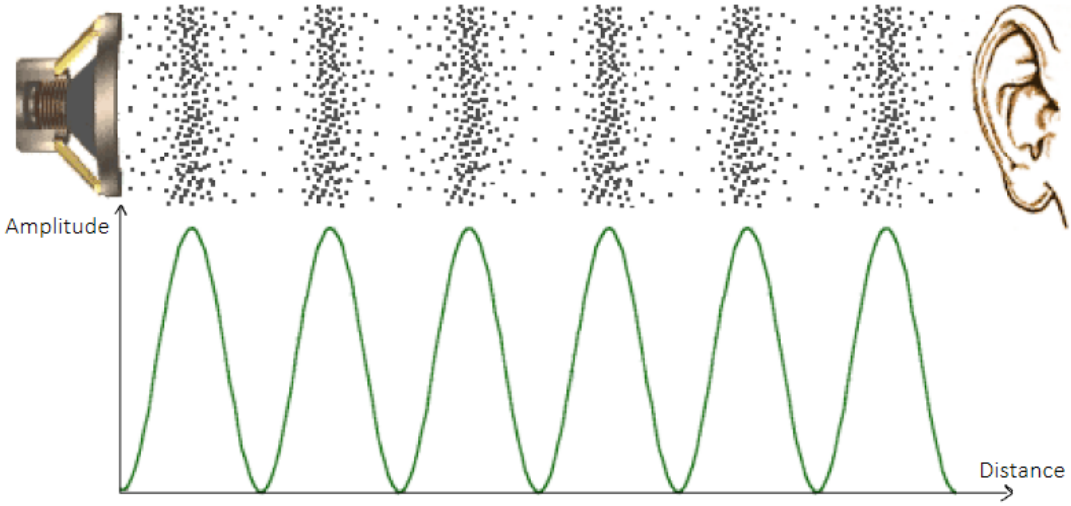
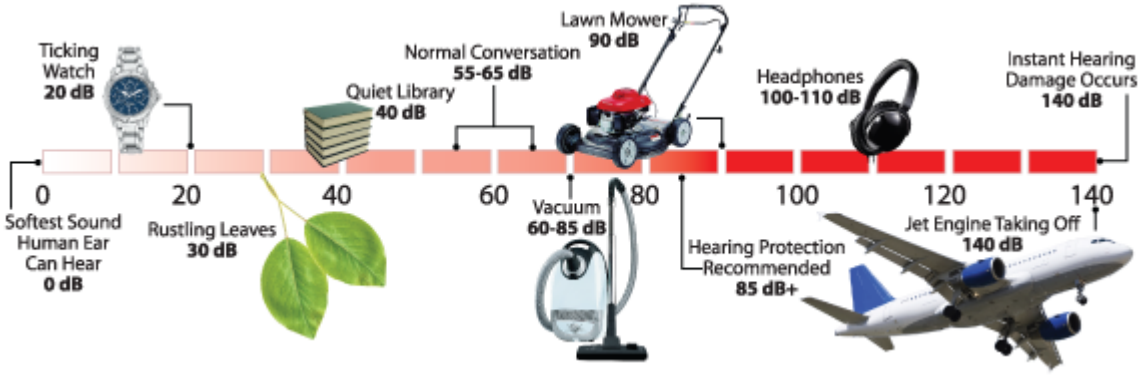
Sound Sensor

Background

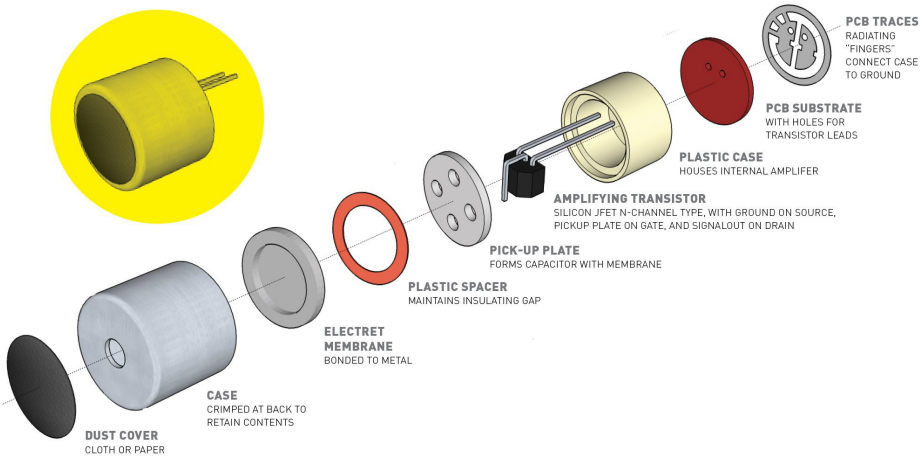
Sound is the compression and decompression of molecules in a material. When we talk about 'loudness', or **amplitude**, of a sound, we generally refer to how compressed the molecules are relative to those around them.



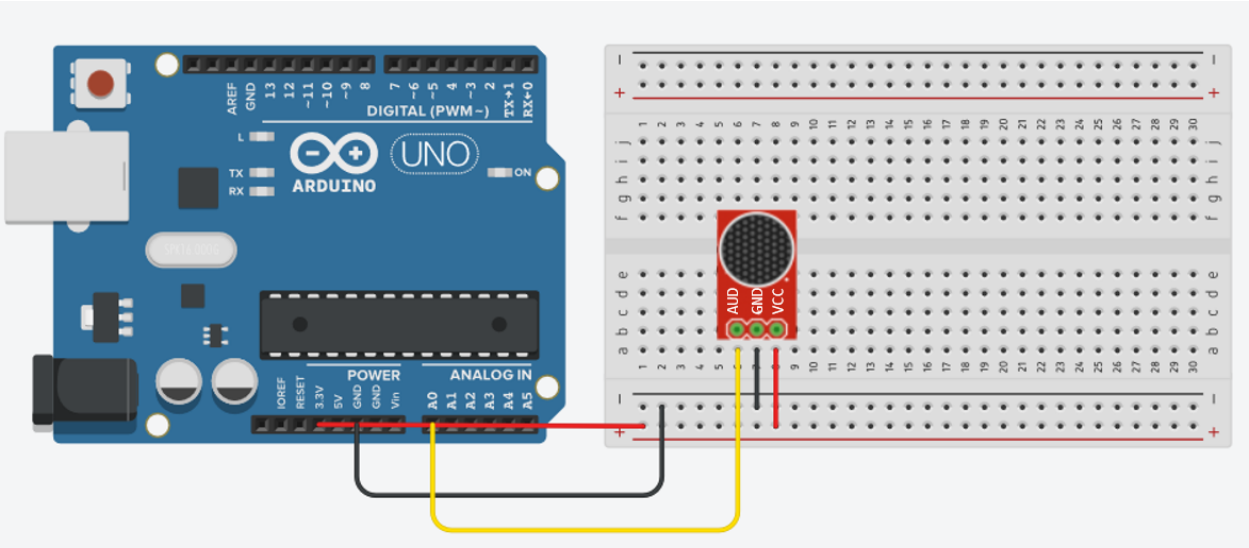
The relative loudness of a sound is measured in **decibels** (**dB**). Why do we use decibels to measure loudness, and what do they mean? Looking at the above picture, we could represent amplitude by how close together the molecules are (which we call their Pressure). But we are usually more interested in how loud a sound is compared to another sound. The unit dB represents the comparison of one value to a reference value. For sound, our reference level is the threshold of human hearing at 0dB.



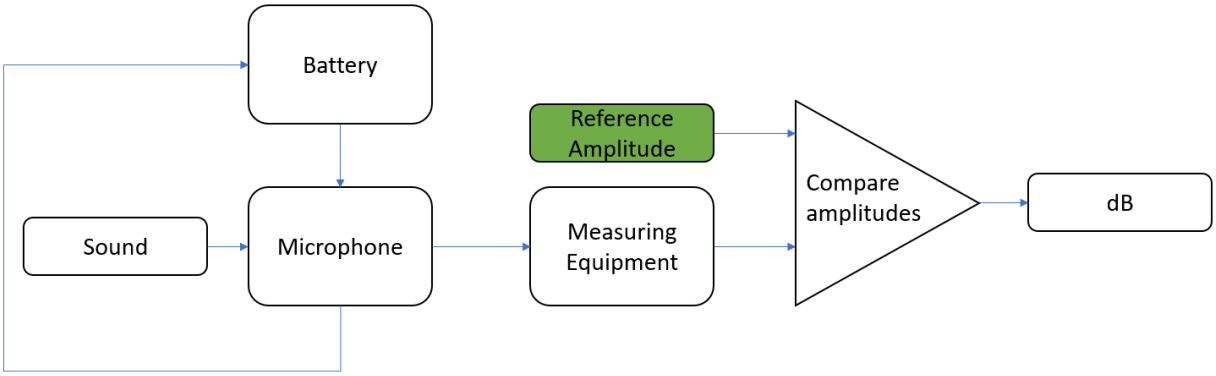
The sound sensor works by producing a change in voltage for a change in pressure. There is a small membrane inside the sensor that vibrates with the changes in pressure (like a drum) and produces a voltage proportional to the loudness of the sound.



The circuit below shows how to wire the sound sensor. Wire your sensor and run the sound sensor code on your Arduino, then look at the output of the program on the Serial Monitor.



The serial monitor is printing out the voltage from the audio (AUD) line, so it is printing out in units of **volts**, not **dB**. How do we convert from volts from dB? We need a **reference level**. Look at the systems diagram below which represents both our circuit and the process for converting our measurement from volts to dB.



If we know the voltage output for a certain dB level, we can convert any voltage level into a dB value. Follow the worksheet 2 to determine how to implement this.