

James Tindle & Zoe Wagner
Under Pressure

Last year, we studied gravitational wave detectors together, and we thought that it was interesting how the gravitational wave detectors found such small differences using a laser to make the measurements. We wanted to do something similar and use a machine to measure minuscule differences in the results. We then talked about things that we could do and came up with the question: 'How does air pressure affect the speed of sound?' We built an apparatus out of PVC pipe that uses an oscilloscope to measure the speed of sound at different air pressures. We used a bicycle pump to increase the air pressure inside the pipe. We tested the air pressure in increments of 10 pounds per square inch (psi) from 0 to 100. We used the oscilloscope to send a signal to the speaker which converts the signal to a sound that travels to the microphone at the other end of the pipe. The oscilloscope measured the amount of time it took for the sound to travel through the pipe. At 0 psi, it took 1.7 milliseconds to travel the 23 inches from the speaker to the microphone. At 100 psi, it took 1.67 milliseconds to travel the length of the pipe. We learned that the higher the air pressure, the faster the sound.