**The graduated cylinder.** To the left of the screen, and mostly filled with water at the start, is the graduated cylinder. The sound produced by the speaker will travel down the cylinder freely until absorbed by the water. The length that the sound travels before hitting the water can be read on the scale on the cylinder in centimeters. It has only been divided into 10cm sections, so anything in between multiples of 10 must be accurately estimated.
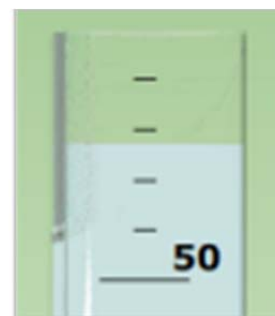


**The water reservoir.** To the left of the cylinder is the tin can used as the water reservoir. It's connected to the cylinder by a hose that allows water to flow freely back and forth between the two. Thanks to gravity, the level of water in the cylinder will always match the height of the reservoir. So as the reservoir is lowered it takes in more water and the level in the cylinder drops, and vice versa. And while the cylinder is a nice circular shape, the reservoir is actually a very long oval shape that extends deep into the screen allowing it to take in more water than its height suggests. To move the reservoir up and down simply click and drag it along the metal stand.
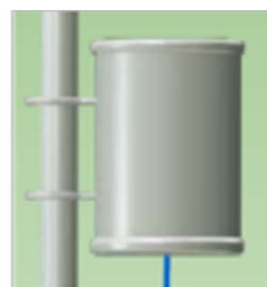


**The control panel - Keyboard.** In the control panel, the user can play a key on the piano to select the frequency. There are 24 choices plus one mystery tone available. All notes and frequencies (other than the mystery key) are shown above the keyboard. To stop the sounds, press of Off button.
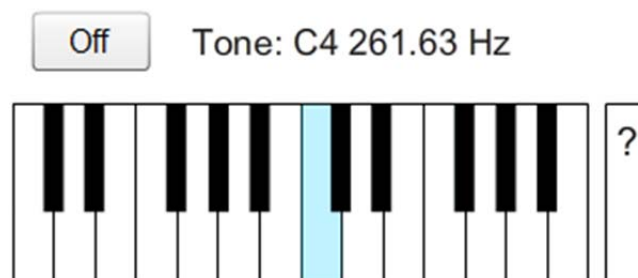
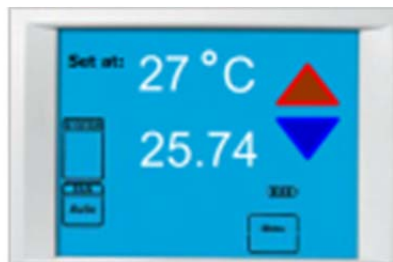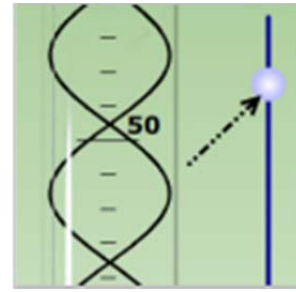| | |
|---|---|
| **The control panel – Volume Control.** Aside from the native computer speaker volume, the lab itself has a volume setting in the control panel. Ranging from 0-100, this setting defaults at 20, which is 20% of your native computer volume. The bar underneath of the Volume Control shows the sound graphically, with green being little sound and orange-red being maximum sound. | Volume Control: 35 |
| **The control panel – Gases.** There are three buttons in the control panel labeled "Air," "Helium," or "SF6," which will change the gas in the virtual lab room when clicked. A cloud of gas should move across the screen, and the background will change to a specific color for that gas. | Gas: Air Helium SF6 |
| **The control panel - Lines.** The other addition is the ability to drag and drop lines on to the cylinder to mark various points along the way. This is useful for marking multiple nodes on the screen at once. This option, as well as its "Clear" button, are both found on the control panel. | Clear Lines |
| **The thermostat.** A standard thermostat is found in the bottom right corner of the screen. The top number is the temperature that is set and the number below is the actual temperature of the room. To adjust the set temperature, click the up or down arrows as many times as needed. It may take the room temperature a short time to adjust appropriately. | Set at: 27 °C 25.74 |

| | |
|---|---|
| **Wave Display Adjustment.**   When the room temperature is on a multiple of 10 degrees (0,10,20,30,40), a simple standing sound wave will be shown in the cylinder. Using the blue slider to the right of the cylinder, the user can adjust the frequency of this displayed sound wave by clicking and dragging up and down. <u>This can be fine-tuned using the up and down arrows which will slowly adjust the wave.</u>  In the lab, the user can match this visual display with the resonance levels found to determine the wavelength and ultimately speed of the sounds involved. |  |
| **Speaker.**   Above the cylinder is a small but powerful speaker with the cover removed. When the sound is on, it will vibrate and pump the standing wave down into the cylinder. |  |