

## ELECTRONIC THERMOMETER

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Now let's make an electronic thermometer. This one makes noise to tell you the temperature, instead of using numbers like most thermometers. A sound thermometer could be a real practical gadget in a quiet hospital ward.

**Start by connecting #19 to #33**

**Connect #33 to #36**

**Connect #6 to #20**

**Connect #20 to #23**

**Connect #5 to #35**

**Connect #35 to #38**

**Connect #24 to #37**

**Connect #37 to #39**

**And the last connection is #25 to #34**

Now hook up the battery. Did the piezo transducer make some noise? If not, check the connections. If it did, great job! You're really getting the hang of this! Now place your fingers around the 0.05 micro farad capacitor. Does the tone change? As you hold the capacitor, it will get warmer, allowing it to hold a different amount of electricity, and the tone changes. When you let go of the capacitor, it will cool down and the tone will change again (blow on it to cool it down and change the tone.) Cool, huh? . . .

**Here's how the circuit works:**

The capacitor is the star of this show, because it holds a different amount of electrons when it's hot than when it's cold. Let's think about it in terms of our Electronic Pinball Game to see what's happening.

The electrons get a push from the battery, hit the transformer and bounce to the capacitor. When the capacitor is hot, it can hold a different amount of electrons which changes the amount of time it takes to fill up, which means the tone changes.

If you were to stick the workbench in the freezer, the capacitor would get cold. This changes how fast the electrons oscillate back and forth between the capacitor and transformer, which makes the piezo create a different tone.

Try it out! Put the workbench in the freezer for a few minutes, and see if the tone changes. Or try hooking up different sized capacitors.