EDITED BY Sophie Bushwick

Make Sweet Holiday Music

JINGLE ALL THE WAY

STATS

Time 2 hours
Cost $55
Difficulty
• • • • •

In 2007, electrical engineer Jay Silver discovered how to turn anything into a musical instrument. While tinkering with an electronic-organ kit, he accidentally spilled lentils on the kit's circuit, which produces musical notes. "As I was trying to dry it out," he says, "I noticed the noise was changing." He realized that touching the device shifted the sound.

The next day, Silver took the circuit to the summer camp where he taught and showed the campers how it worked. When it came in contact with conductive objects, they acted as extensions of the device: Users could touch the object to create different sounds, like pressing the keys on a keyboard. Silver's campers tested it out, making music with everything from apples to bicycles. Later, a co-worker suggested that Silver hook up the circuit to a pencil, since electricity can pass through its graphite core. The result was Drawdio, a pencil that plays "music" when you draw.

Silver published instructions for Drawdio online, and he loves when people use his idea to create something new. With that in mind, Popular Science built a caroling candy cane—and so can you. STEPH YIN

For tips and photos, visit popsci.com/candymusic.

WARNING: Don't get milk—or any other liquids—on the circuit or battery.

PHOTOGRAPH BY Jonathon Kambouris

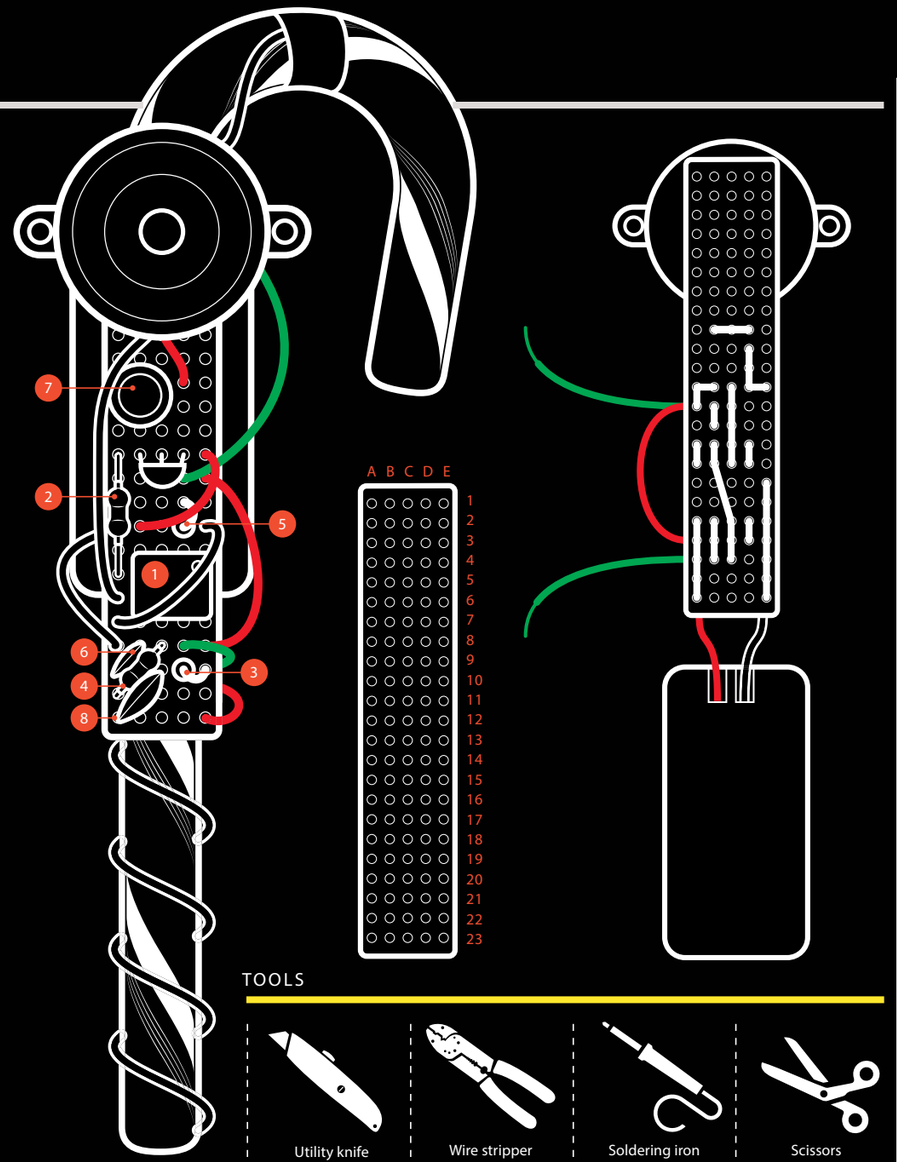
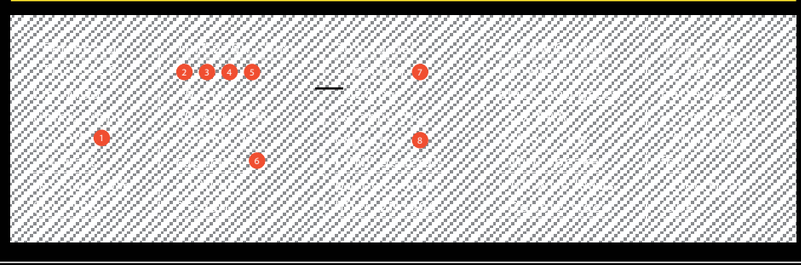


ILLUSTRATION BY CLINT FORD

TOOLS

Utility knife | Wire stripper | Soldering iron | Scissors

MATERIALS



INSTRUCTIONS

1
Using a utility knife, cut your perfboard into a rectangle with five rows of 23 holes. Insert the TLC-555CP timer with the upper left corner at A16. Bend the timer's legs out underneath the perfboard to keep it in place.

2
Stick the resistors, capacitors, and amplifier in the perfboard as shown. Use jumper wires to connect A12 to D15, A15 to E19, and A13 to A20. You can put a foam block beneath the board to hold the pins.

3
Cut 5 inches of green wire, insert one stripped end into B13, and strip 2 inches from the other end. Cut 8 inches of green wire, insert one stripped end into B20, and strip 5 inches from the other end.

4
Strip and tin the leads of the battery clip. Insert the negative lead into E20 and the positive into A23, leaving an inch of wire between clip and perfboard. Strip and tin the leads of the speaker, and attach to the board as shown.

5
Remove everything from the board except the timer. Solder a jumper between pins 2 and 6. Then insert the other components, except for the speaker, in the same order you did before. Solder their leads together under the perfboard, as shown.

6
Use double-stick foam tape to attach the speaker to the perfboard. Solder the leads into the circuit.

7
Test your circuit: Insert batteries and touch the exposed green leads with your hands. The speaker should emit a tone that changes pitch based on the resistance between the green leads. In other words, moving your hands should alter the sound.

8
Use double-sided tape to attach the perfboard and battery clip to a candy cane. If you plan to reuse the circuit, just wind electrical tape around the unit to hold it in place.

9
Coil the short green lead up the hook of the candy cane and the long green lead down its body. Wrap a band of aluminum foil around each lead and tape closed. Now you can make music!

10
Grip the candy cane with one hand, touching the wire, and lick from the top. You can also try dipping the candy cane into a mug of hot chocolate, keeping the circuit dry, and drinking from the mug with a straw. Or stick one finger in some water on a saucer, and make patterns in the liquid while holding the candy cane in your other hand.