"Operation"

How to Build It:

Materials:

- ☐ Foam board (8 x 10")
- ☐ Cavity Sam cut out
- ☐ Glue stick
- ☐ X-acto knife
- ☐ Solder
- ☐ Soldering irons

- ☐ Cardboard squares (Body = 4.5 x 4.5 inches, Legs = 2.5 x 3 inches)
- ☐ Tinfoil
- ☐ Hot glue
- ☐ 9V battery
- ☐ 9V battery lead

- ☐ Orange Wire (6 inches)
- ☐ Yellow Wire (8 inches)
- ☐ Blue Wire (8 inches)
- ☐ Black Wire (2 inches)
- ☐ Buzzer
- ☐ LED light

- ☐ Soldering iron and Solder
- ☐ Large paper clips to bend into tweezers
- ☐ Beads, buttons, rubber bands, etc. to use as body parts

Procedure:

1. Cut out all the holes for body parts, the buzzer, the tweezers, and the nose.
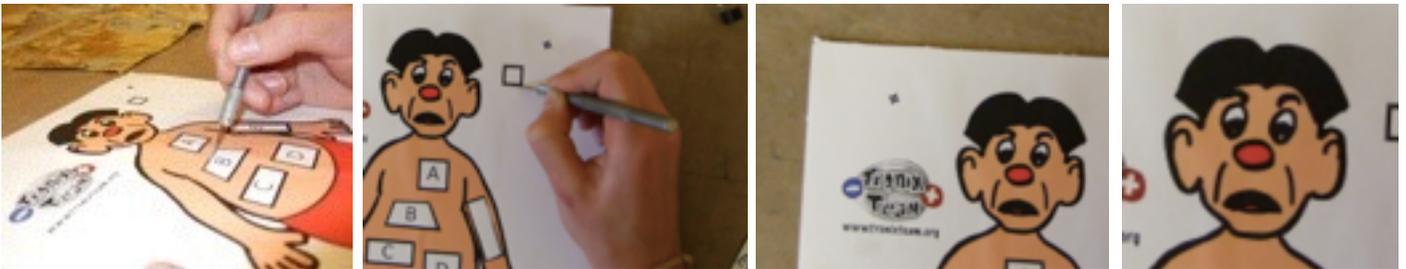
2. Install the buzzer and LED light making sure to mark which side is + and which side is -
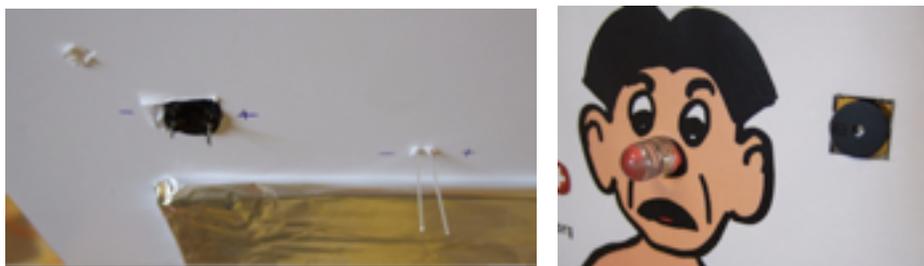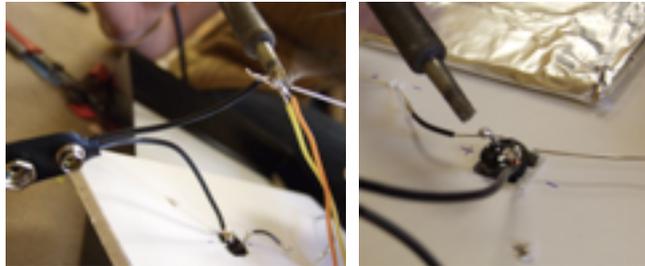

3. Solder together the - side of the LED to the + side of the buzzer using a short insulated wire.

4. Wrap the cardboard pieces in foil and glue to the back

5. Using aluminum foil tape, attach the long Yellow wire to the Legs segment; attach the Orange wire to the Body segment

6. Twist the free ends of the wires together and solder them together

7. Solder the ends of the wire to the Red or Black with white stripe (+) side of the battery lead

8. Solder the other end of the battery lead, solid black (-) to the negative side of the buzzer

9. Solder the long tweezers wire to the long positive side of the LED
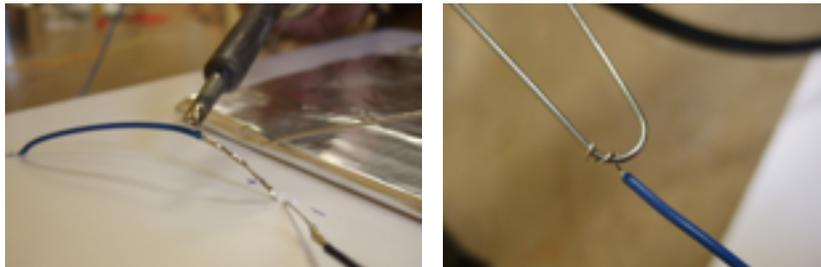
10. Poke the tweezers wire around to the front of the board and solder the tweezers on to the wire

11. Use hot glue to install the board inside a shoe box lid to keep from losing pieces.

12. Connect the battery

13. Fill the cavities with body parts and PLAY!

How it Works:

The cavities in Sam's body are backed by tinfoil, a conductor of electricity. The tinfoil is connected by the orange and yellow wires to a 9V power source. The other side of the power source is connected to the buzzer and the LED in series. Typically, a 9V power source is too much for an LED to handle and the light would blow out, but because the LED is connected to the buzzer in a series circuit, the buzzer provides enough resistance that the LED does not blow out and we are able to enjoy both at the same time by using a simple circuit! The tweezers are important for completing the circuit and act as a switch. When the tweezers bump into the tinfoil behind the cavities, the circuit is completed, the power switches on, and the light and buzzer tell you to be more careful when you take out the body parts!

Experiment!

In the original "Operation" game, it is the sides of the body cavities that are electrified. How could you make the sides of the holes electrified?

Other Resources:

Find out how other people have made their own versions of Operation by searching on Instructables.com
  http://www.instructables.com/id/Operation-Game/
  http://www.instructables.com/id/Your-own-Operation-Board-Game/