

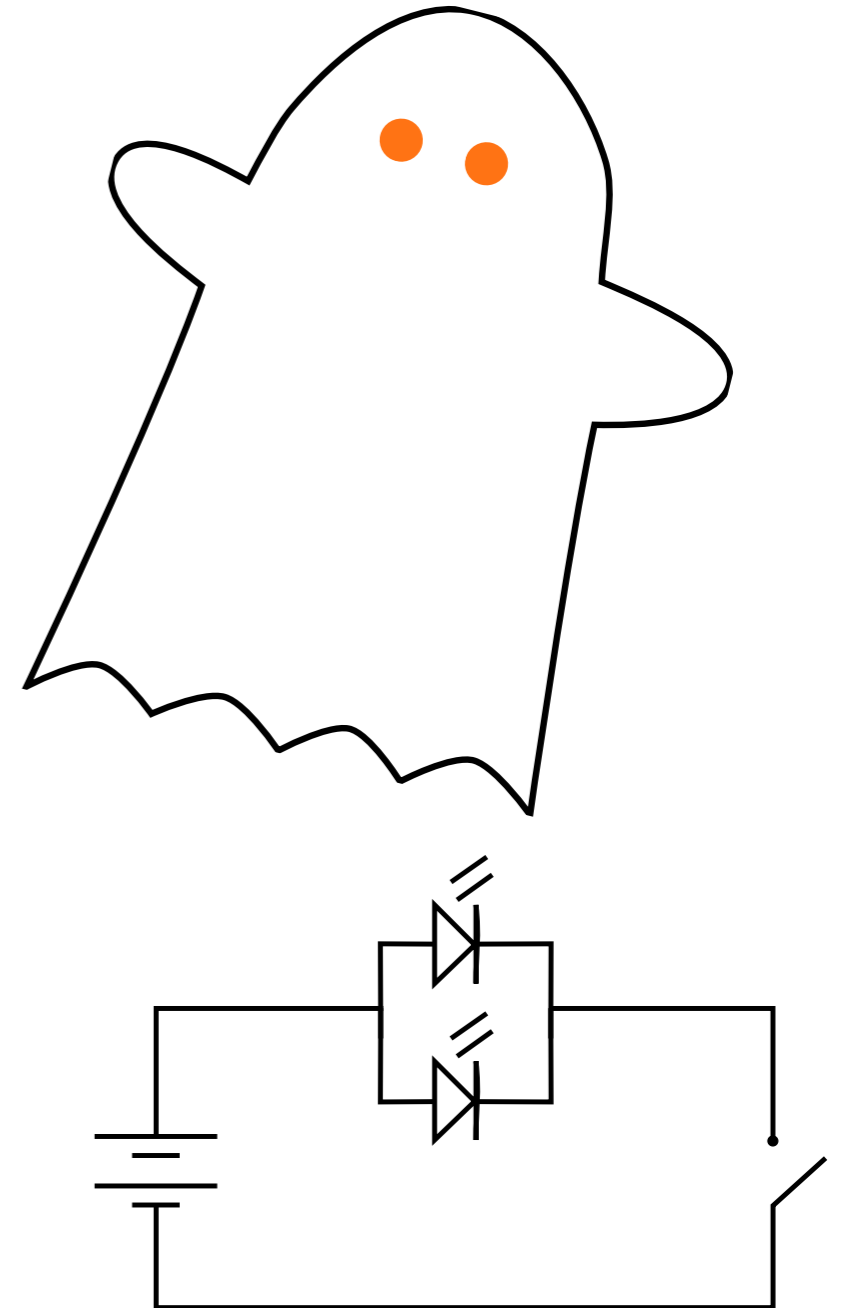
# Soft Circuit Ghosts

## Tools

Needle-nosed pliers  
Sewing needle  
Scissors  
Voltmeter with continuity measure  
Iron  
Alligator clips

## Materials

Felt  
2 LEDs  
Coin cell battery  
Conductive fabric  
Conductive thread  
Pin  
Non-conductive thread



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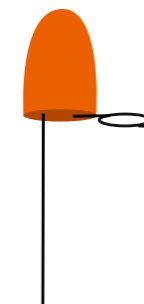
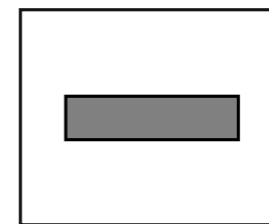
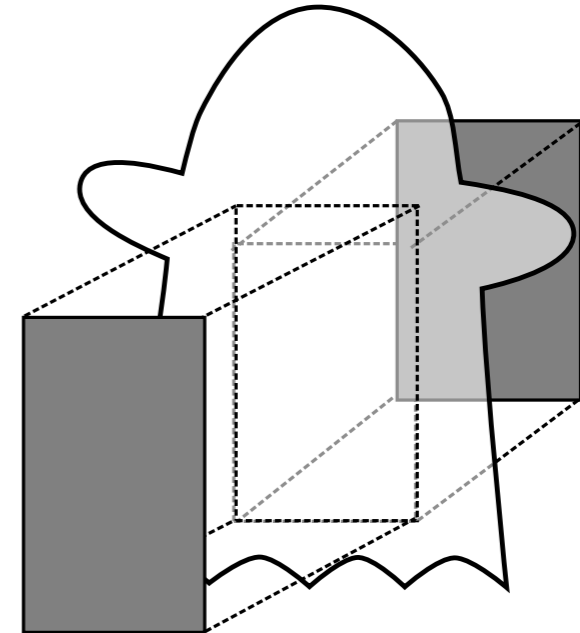
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# Prepare the Materials

1. Cut out 3 ghosts and 1 rectangle from the felt.
2. Cut out 3 rectangles from the conductive fabric.
3. Take the piece of felt that will be the middle ghost. Remove the paper from the back of the conductive felt and iron on the largest rectangle to the front of the ghost.

On the back side of the same piece of felt, iron or sew on the other large rectangle of conductive fabric. The bottom edges and sides of the two rectangles should line up with just a small strip of conductive fabric higher on the front of the ghost.

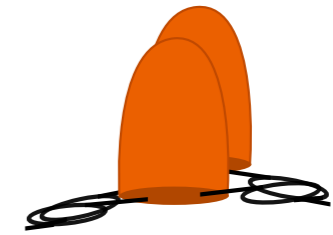
4. Iron or sew on the smallest rectangle of the conductive fabric to the centre of the felt rectangle.
5. Using the needle nose pliers, twist the legs of the LEDs into rings.



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# Sew the Circuit

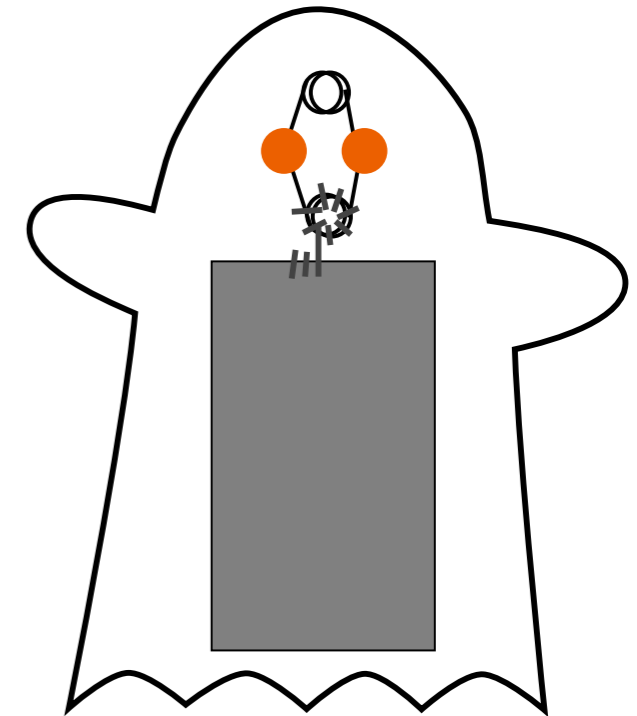
6. Place the LEDs so that each leg twisted into a ring now sit on top of each other. Using the alligator clips, check and make sure both LEDs light up when you create a closed circuit. If neither light up, switch around the battery. If only one lights up, switch the orientation of one of the LEDs.



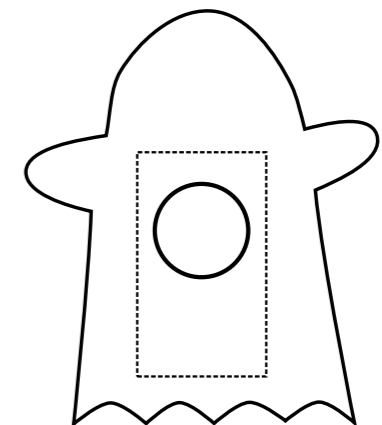
7. Once you have the LEDs aligned in the same directions, using the conductive thread, sew from the conductive fabric on the front of the middle piece of felt to the bottom rings of the LEDs.

Be sure to make a large number of stitches to make a strong electrical connection. Knot and cut the thread. Be sure that there isn't a connection made between both pieces of conductive fabric.

Using the alligator clips again, create a closed circuit between the conductive fabric on the front of the ghost and the top rings of the LEDs. They should still light up. If they don't check over your sewing and make sure you haven't created a short circuit and that you have good electrical connections.



8. Take the piece of felt that will be the back of the ghost and cut out a circle the size of the battery so that the battery will sit completely on the back piece of conductive fabric.



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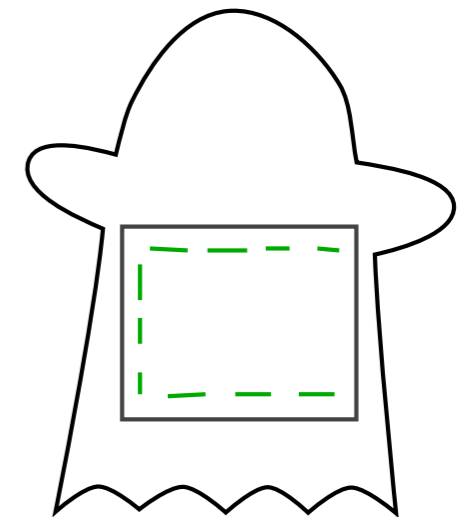
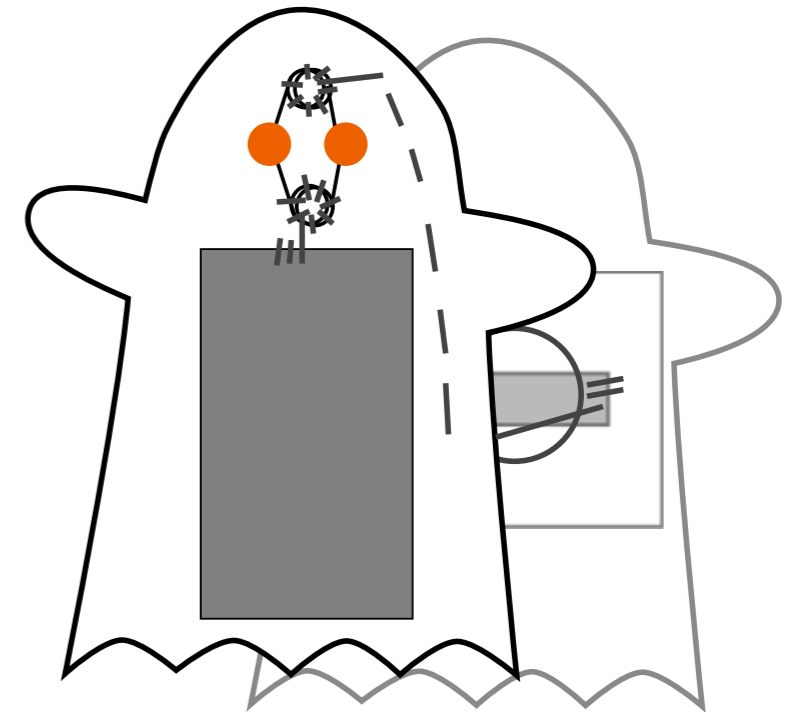
9. After making sure the LEDs are aligned properly and will still pass current, using the conductive thread, sew the remaining two rings of the LEDs to the felt.

Using the same piece of thread, sew a path along the side of the ghost being sure not to touch the conductive fabric. When the path is near where the battery will sit, sew the thread through the middle piece of felt and the back piece of felt and to the edge of the conductive fabric on the rectangular felt. After securing a few stitches, knot and cut the thread.

10. You can now check to see if the entire circuit is working. Put a pin or needle through the ghost to electrically connect the two pieces of conductive fabric. Place the battery on the back piece of conductive fabric and touch the small rectangle with the conductive fabric to the other side of the battery. If the LEDs don't light up, try flipping over the battery. If the LEDs light up, congratulations! You've sewn the circuit correctly. If they still don't, go back over the previous steps and check that you don't have stray threads creating short circuits and that you've sewn firm electrical connections.

## Complete the Ghost

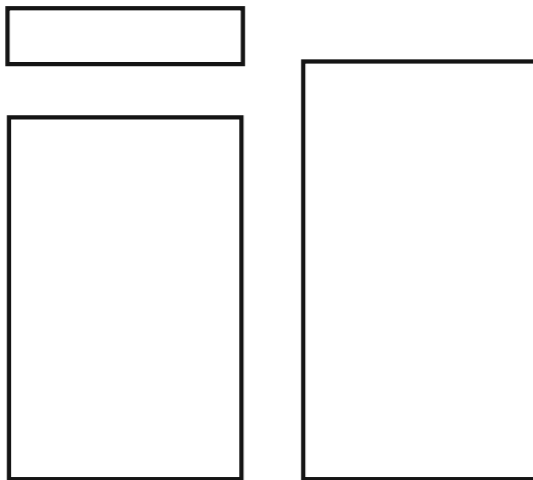
11. To hold the battery in place, sew the rectangle along 3 sides to the back and middle pieces of felt.
12. Put the front piece of felt on top of the middle piece with the circuit. Cut holes for the LEDs and push the LED eyes through the front piece. Sew the three pieces of felt together.



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# (Iron-On Optional) Conductive Fabric

Cut out 1 of each



# Felt

