

How to Make a Poinsettia Circuit Puppet

Creating a pop-up circuit card is a fun way to learn about circuits, elasticity, and a material's strengths and weaknesses

Visit <http://pbskids.org/designsquad/build/string-puppet/> where we learned how to make one without a circuit.

Materials List: (Most of these supplies can be purchased on amazon.com and joanne.com)

- Card stock paper, variety of colors
- Paper scraps and arts and crafts bits for decorating
- Tape
- Pencils, Markers, colored pencils etc.
- Scissors
- Hole punch
- Pin
- Drinking Straws
- Smoothie/Bubble Tea Straws
- Fishing line (we bought south bend 50 lb monofilament on amazon.com)
- 5mm LEDS



- Cr2032 lithium 3 volt batteries



- Thin conductive wire, we used 26 gauge Panacea Corp florist wire from Joanne.com (even the kid scissors cut it and it is soft and pliable)



1. Draw, color and cut out 1 large design and 3 smaller designs on card stock paper.
2. Choose a colored LED to compliment your design.



3. Poke 2 holes with a pin.



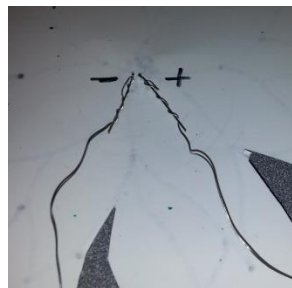
4. Put the LED legs through the holes



5. Bend down the LED legs so they lie flat.



6. Cut 2 pieces of wire, 3x the length of a straw. Twist the wire around each LED leg.



7. Tape down the wires. Make sure positive and negative are not touching so it doesn't short circuit.

8. Test to make sure your light is working





9. Put a drinking straw (the neck) through the plus wire and tape it down.



10. Take 2 additional drinking straws and cut little triangles out of them two – four different places near one end. How many notches depend on how many times you want the straw to bend.



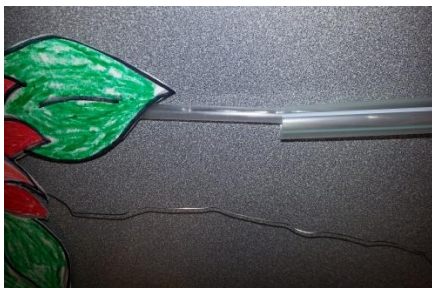
11. Cut 2 pieces of nylon fishing line, 3x the length of a straw. Tie a knot in one end and put them through the notched straws (the arms).



12. Securely tape the nylon to the straw. Tape above the knot. The knot will help prevent the nylon from slipping when you pull on it to animate the arms.



13. Put the bubble straw through the neck straw.



14. Put one of the straw arms through the bubble straw. The nylon line should come out of the bottom of the bubble straw.

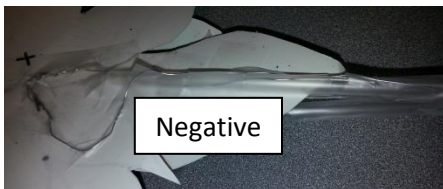


15. Put the second arm through the bubble straw, position the arms as you want them. Practice pulling them from the bottom to see if they are bending the way you want them too.

16. When you get them the way you want them tape the connection.



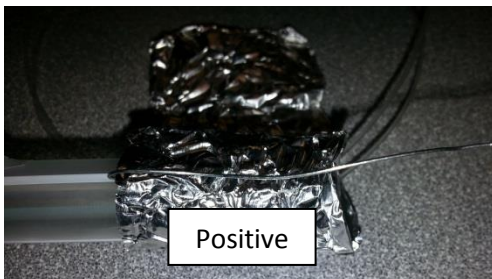
17. Now tape the negative wire down to the neck and bubble straw.



18. Have it move over to the front of the straw and end the taping about 2 inches from the bottom of the bubble straw.



19. Now wrap some aluminum foil around the bottom of the bubble straw entwining the positive wire in it. This will increase the area of conductivity for the switch to connect with.



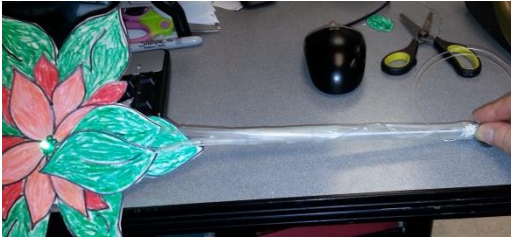
20. Cut off any extra positive wire and tape the top of the aluminum foil to the bubble straw. Try not to get too much tape on the aluminum foil so you have a lot of room for the switch to make contact.



21. Time for a test run. Rest the positive side of the battery on the aluminum foil and the negative wire on the negative

22. Time to make the battery pack/switch. Cut out a piece of card stock about 2" by $\frac{3}{4}$ ".

side of the battery. Hope your light comes on otherwise recheck your work for a loose connection or a place where positive and negative are touching creating a short circuit.



23. Fold the piece in half. Use a hole punch to make approx. a ½" by ½" hole.



24. Tape the sides of the battery holder to turn it into a pouch, leave the top open and don't cover up the hole with tape.



25. Take the negative wire and wrap it into a circle so that it lands over the aluminum foil. You may need to trim it if it is too long.



26. Tape the negative curled wire to the negative side of the battery.



27. Slip the battery pack onto the battery and make sure the plus side is showing in the hole. Tape it down to the straw.

28. Make sure the negative wire is not touching any of the aluminum or you will get a short circuit.



29. Tape your arm decorations and your battery pack decorations on.



30. Now try it out. Push the battery pack/switch to light up your puppet. Pull the nylon lines to animate the arms.



And you are done!