

Fireflies

Required Parts

- index card
- 4mm 12 V grain of wheat (also called grain of rice) bulb with two wires extending from them
- 20 feet black insulated single core wire wrapping wire (the thinner the better) 8-30-1000 AWG 30
- 10 feet black insulated electrical or speaker wire, dual strand, AWG 22
- black heat shrink tubing 3/64" i.d. and 5/64" i.d.
- black electrical tape
- 12 V battery box
- 12 V battery
- small, ideally black, fan that can be set so the air goes upward

Required Tools

- black permanent marker
- Black electrical tape
- Wire cutter
- Wire stripper for small gauges
- Soldering iron and accessories
- Goggles
- Helping hands magnifier
- Need nose pliers
- Heat gun

Caution: These instructions assume knowledge of soldering and appropriate safety precautions. If you need a refresher on soldering please check out this web site: <https://www.makerspaces.com/how-to-solder/>

Instructions

1. Cut 3" x 1 1/2" rectangle from the index card and blacken both sides with the marker. Make a pinhole in the center trying not to bend the piece of index card.
2. Take the single core wire and loop it in half. Tie a knot 6" from each end and then approximately every foot. Cut the loop resulting in two wires tied together. Remove insulation 1/2" from the four wire ends.
3. Remove 3/4" of insulation from each of the speaker wires at one end. Solder each speaker wire to one battery box wire using heat shrink tubing to cover the solder joint.
4. Solder the two wires at the other end of the speaker wire to the two ends of the knotted wires using heat shrink tubing to cover the solder joints.
5. Trim the bulb wires: cut about 1/4" off of each. Take one of the index card rectangles and place one bulb wire through the hole in the card such that there is a bulb wire on each side.
6. Take the knotted wire and solder one wire to each of the bulb wires, with a piece of the heat shrink tubing above the solder joint. Cover solder joints with the heat shrink tubing and shrink it over the solder joint.
7. Use black tape to tape the bulb wires to the card with one wire on each side of the card.
8. Put battery in the battery box to assure the light is working.
9. Hang the firefly so the bulb is at about eye height. Put the rest of the wire over a tree branch or other means of holding up the firefly with the wire hanging straight down.
10. Place the fan below and facing up towards the firefly. Adjust as needed to get the desired movement.
11. If using multiple fireflies, hang them at slightly different heights and far apart enough so there is adequate room so they do not run into each other.

