

SOLAR FLOWER KIT

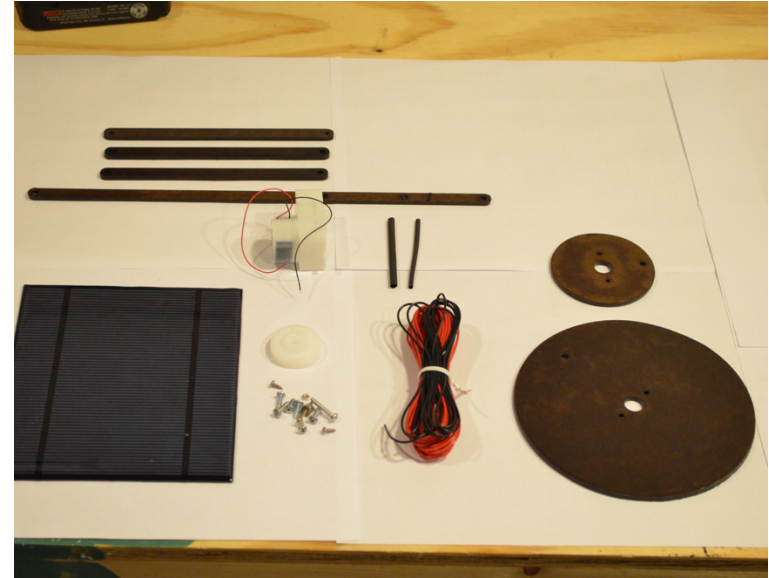
basic electronics, solar power, and art



Solar Motion Kit

The Solar Motion Kit is an efficient way to make use of solar power to create motion in your project. The parts in this kit will allow you to build many different mechanisms and we will outline three possibilities in detail. The following parts are included in your kit:

- High Efficiency Gearmotor
- Sealed 5V 500mA Solar Panel
- Assorted wooden discs
- Assorted wooden levers
- Adapter hub for motor
- 30 gauge stranded wire
- Heat Shrink Tubing
- Assorted screws



Components in the motion kit

Solar Motion Kit

In addition to your kit, you will need to obtain the following tools and materials. Remember, you don't need to rush out and buy anything. Consider asking someone to borrow their hot glue gun, or other tools, and find a suitable stick outside to mount your sculpture to. Here's the list:

- Wire strippers/cutters
- Small screwdriver
- One piece of wood approx 1"x ½" x36" I will use a stick- just make sure it is not rotten, and not thinner than ½" at the small end...
- Hot glue
- Soldering iron & solder
- Paper & crayons, markers...
- Scissors
- Polycrylic



Solar Flower Kit www.acastronovo.com/solarflower.html

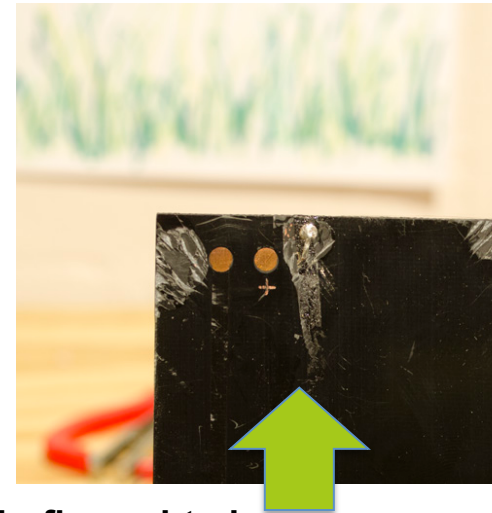
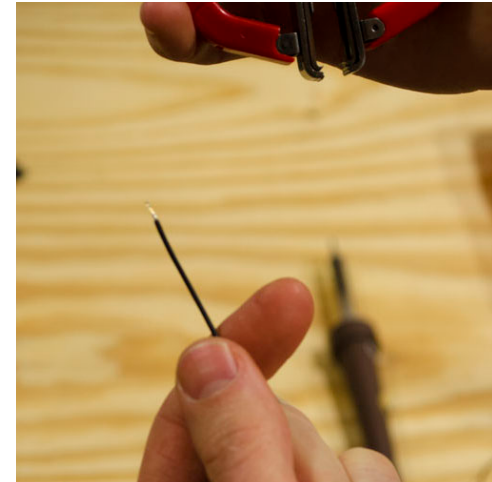
anthonycastronovo



Soldering Wires to Panel

Soldering Wires to Panel

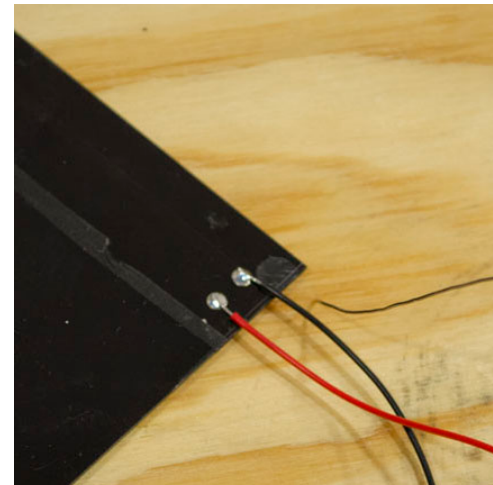
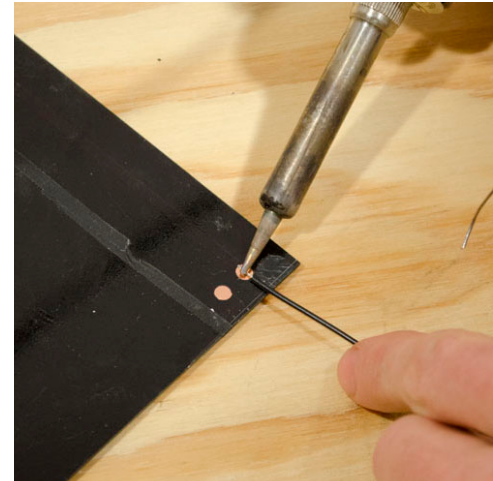
- Our first step is to solder the wires to the panel. We can start by stripping the end of each wire. Strip about $\frac{1}{4}$ " off each end and twist the exposed wire so that it compacts and does not fray (this is stranded wire).
- Plug in the soldering iron and give it 5 mins to get hot. Look at the tip, if it is not shiny silver, give it a wipe on a damp sponge to remove the oxidation. As you work you should wipe the tip before and after each point you solder.
- Look closely at the back of the panel and identify the positive and negative contacts. The positive contact has a plus beside it, and we will solder the red wire to this contact.



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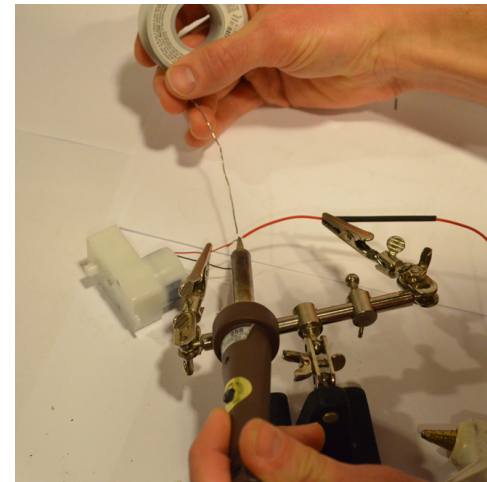
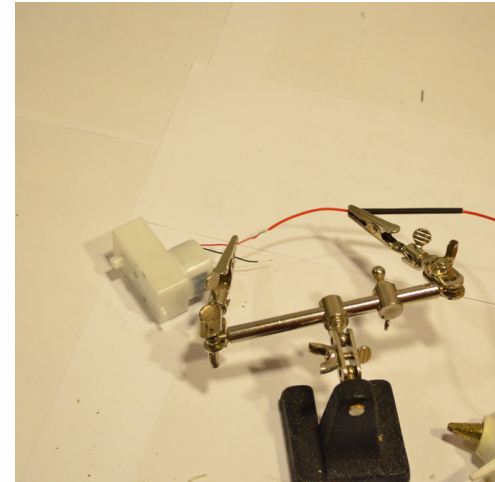
Soldering Wires to Panel

- The tip is hot when you can lightly touch the end with solder and it melts easily. Place the stripped and twisted wire end on to the contact. Place the tip of the soldering iron on the wire, and press down to make firm contact between the iron, wire, and contact on the board. Count to five and then touch the side of the wire with solder. Add just a tiny bit of solder so that the solder flows down onto the contact. It should penetrate the wire and make a solid connection.
- As soon as you see that the solder has flowed into the wire and onto the contact, you can remove the tip of the iron and carefully hold the wire in place for a couple of seconds as the solder cools.
- If you are not steady enough the wire might slip off of the contact before the solder cools. This is OK! You can place the wire back and just repeat the heating process for 5-10 seconds, until you see the solder flow.
- Cover each contact point with hot glue to waterproof.



Soldering Wires to Motor

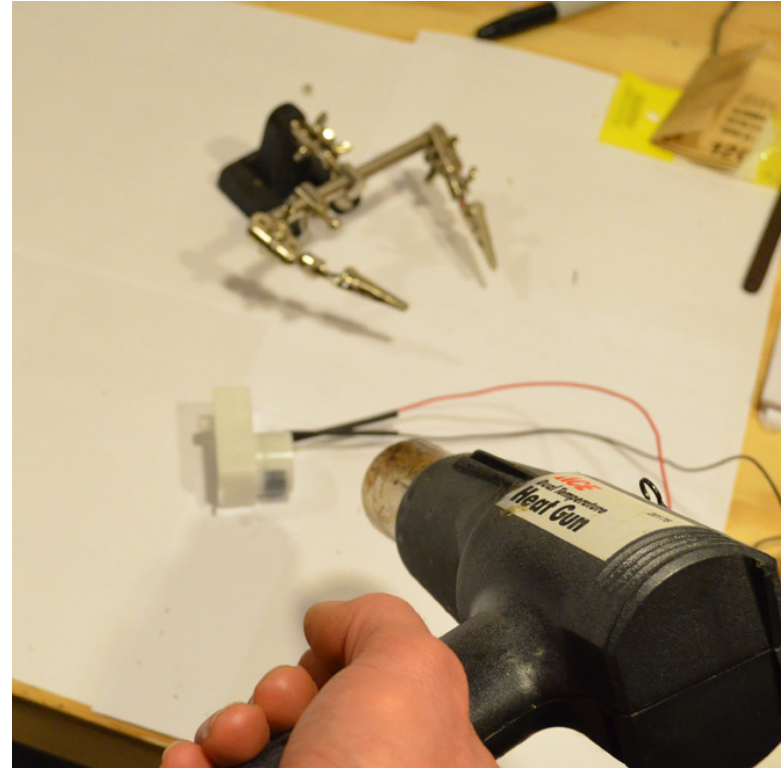
- Cut the wires from the motor so that they are about 2" long.
- Use your finger nails to pinch and pull ½" of insulation off each wire. Be careful though, don't pull the wire out of the motor...
- Strip ½" of wire from the loose ends of the wires that are now soldered on to the panel.
- Place a 2" section of heat shrink tubing over each panel wire and slide it back, close to the panel.
- Twist the ends of the reds wires together. You want to start like you see in the first picture. Then wrap the exposed wires around each other so that the two wires stay in contact and remain in a straight line.
- Use the helping hands to steady the wires by clipping on to each wire around the exposed part. With a hot, clean soldering iron, you can now make contact with the exposed wires, wait 5 secs and add a tiny bit of solder to flow over joint. Not so much that it makes a glob, just enough to penetrate and cover the wires.



Apply Heat Shrink Tubing

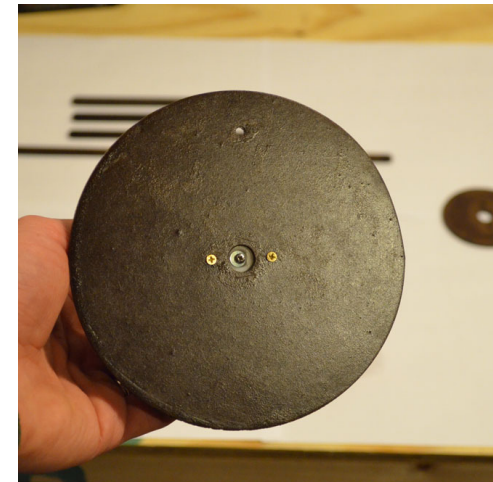
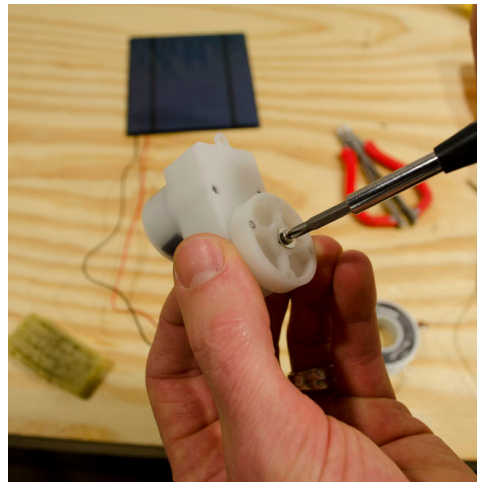
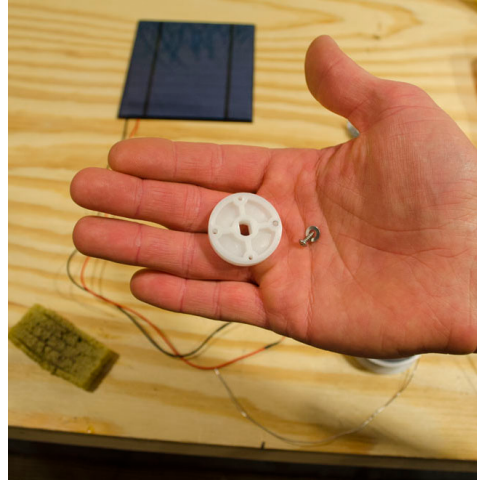
Apply Heat Shrink Tubing

- Make sure the heat shrink tubing covers the both wires all the way back to the motor.
- Heat the tubing evenly and lightly with a heat gun, blow dryer, or lighter.
- Don't over-heat, as you will melt something... just heat evenly, all sides, until you see the tubing shrink down.



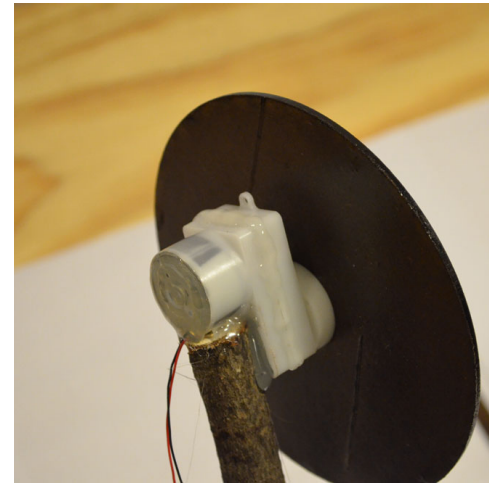
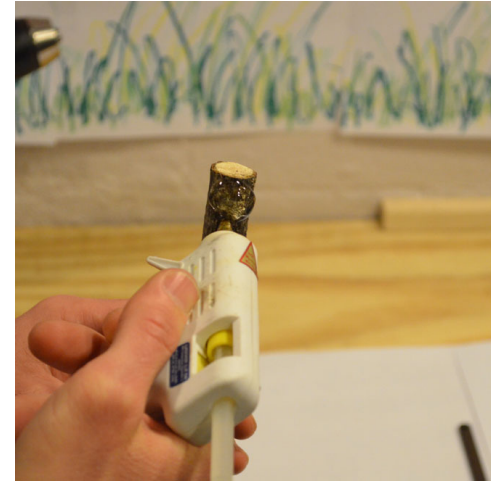
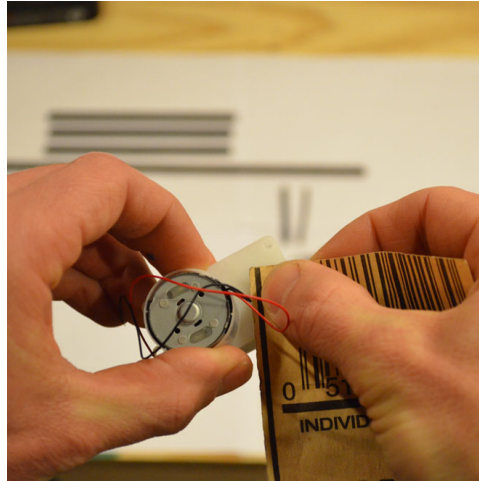
Connect the Motor Hub

- The gear hub is a small plastic part that allows us to attach something to the shaft of the motor. We will use this to attach the wooden gears.
- First, look at the hub and identify the different sides. One side will have a raised lip, the other will be flush. The side with the raised lip faces the motor.
- Secure the hub with the small screw and washer. Be careful not to over tighten, these are easily stripped.
- Now you can mount the large disk on to the hub with two small screws. Again, use the small screwdriver and be careful not to over tighten. Screws should just be snug.



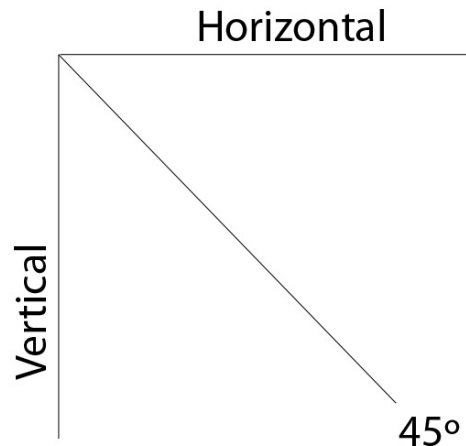
Hot Glue the Motor to Wood

- Sand the side of the motor that will mount to the wood- Sanding roughs the smooth plastic and gives the hot glue something to bind with. see picture >>>>
- Apply a small amount of hot glue to one end of the wood stick, about the size of a dime.
- Place the motor flat on to the wood stick and hold in place until the glue cools. 10-20 sec.
- Add more glue to reinforce the connection to the stick.
- Add glue to cover the back of the motor. Do not force glue into the holes of the metal housing- this could interfere with the motor.
- Also cover the seam on the plastic motor housing, but only on the top and sides- leave the bottom seam as is.



Attach the Solar Panel

- The solar panel will be attached by gluing two of the small wood slats on either side of the wood stick.
- The ideal angle for the panel is 45° from vertical (this is specific to central Michigan during Spring and Fall)
- Visualize what 45° looks like by holding the wood slat against the stick. Realize that 45° is half of 90° and if you can imagine a vertical line and a horizontal line, 45° would go right through the middle of these lines, diagonally.
- Squeeze out a bit of glue and press the piece down, try to match that 45° angle you just visualized. Do the same on the opposite side so that you have one on either side.
- Finally, apply a strip of glue to the top edge of each of these small arms and affix the panel, holding in place for 10-20 seconds for glue to cool. Work fast so the glue doesn't cool before you get the panel down...



Cut the Paper Flower and Color

- Start with a sheet of blank white paper. Any size will work, but I am starting with basic 8.5"x11" printer paper.
- Fold the top corner down so that the top edge of the paper meets the side. Cut off the excess, and fold again corner to corner on the longest side. Place on table surface and run your fingers over the edge with some pressure to flatten the seam.
- Now you can experiment and cut shapes out of the leading edge as in the picture. Try different variations to see what kind of cool shapes you can make!
- Add some color and patterns to the flower using any medium available. Crayons, pens, markers, and paint are a good place to start.
- Seal the paper by coating both sides with polycrylic. Do this on a sheet of wax paper and do one side at a time. Let one side dry before doing the other.
- Finally, attach the flower head to the disk using hot glue.



Conclusions

- This is what the final solar flower looks like!
- Consider working with a friend and make a new life form that has more than one motion.
- Try different materials for the flower head. These might include re-used soda bottles that you cut and shape; or perhaps a larger flower made from a re-used cereal box.
- Be careful when handling the flower, especially the solar panel because it could be knocked off and damaged...but if it does get knocked off, it is pretty easy to just re-glue back on!
- **HAVE FUN!!!**





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www.acastronovo.com/solarflower.html

www.ecoartlab.org