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Solar Bug Kit Instructions

Product Code: 1221507
Brand: Brown Dog Gadgets

Intro: Non-Soldering Solar Bug Kit

For the longest time we've been trying to find a fun way of making a version of that project for even younger students and this is what we came up with!

We found that younger students need a good tactile approach when it comes to solar energy, and we also wanted to our project part "art" as well as part "science." By showing that solar energy can be turned into vibrations we're able give students immediate feedback that they can feel. If you're doing this activity in a classroom we've included a sample lesson plan at the end where students can compare different sources of light, then use the power of the vibrations to compare light power.

Our little Solar Bug is a solar powered vibrobot. This means that it gets it's motion from the large vibrating motor on it's under side.

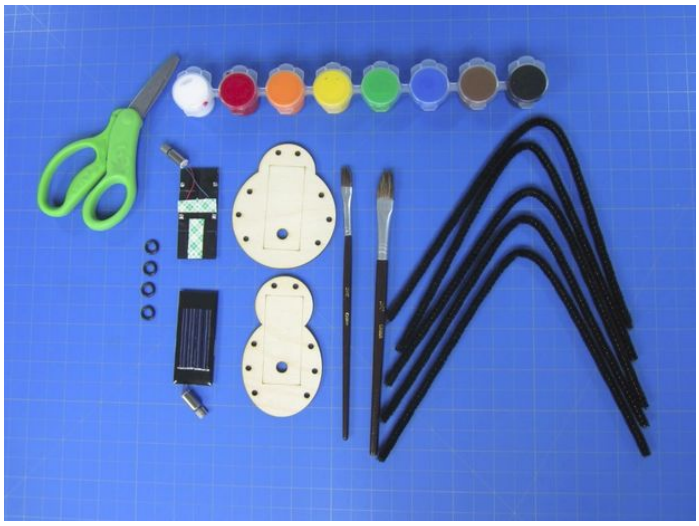
Step 1: Parts and Supplies

Tools Needed:

- Scissors
- Paint Brush

Included Parts:

- 2x 2V Solar Cells
- 2x Vibrating Motors
- 4x Chenille Stems
- 2x Laser Cut Wood Bodies
- 4x O-Rings



Step 2: Decorate Your Bug

Use paint, markers, or pencils to decorate your bug.

Our laser cut pieces have the solar cell marked out, so you can design around it.

If painting, make sure you let everything dry before moving on. Foam tape tends to stick much better when the paint has fully dried.

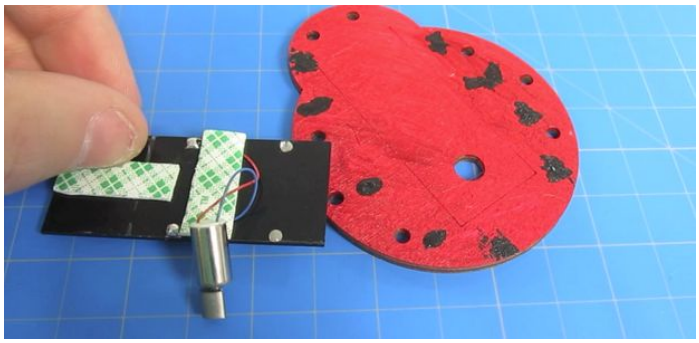
Step 3: Pop in Your Motor

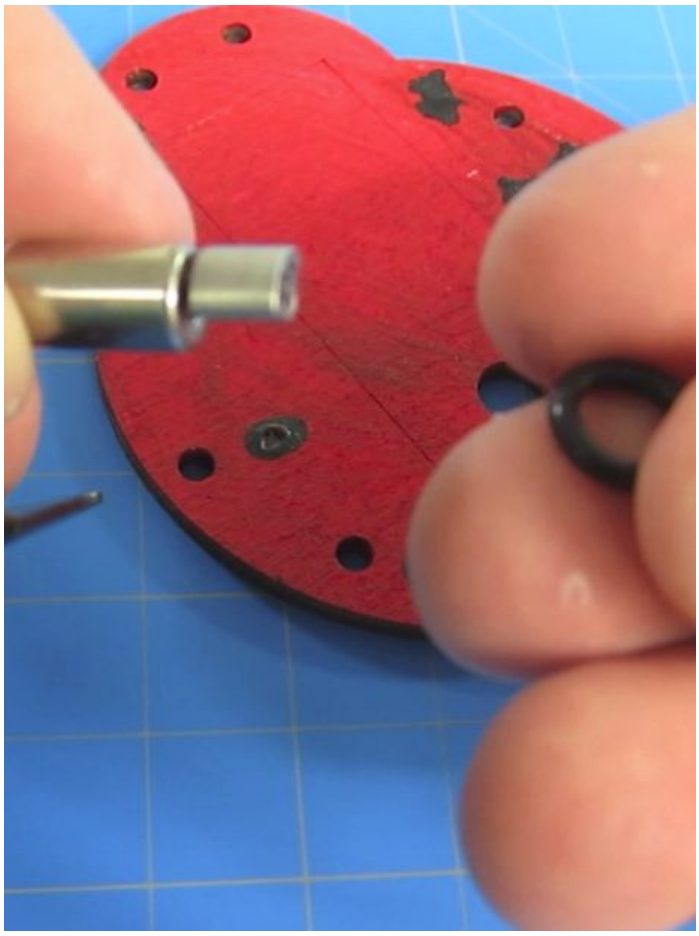
First, slide one rubber o-ring onto the motor. Push it nearly to the top.

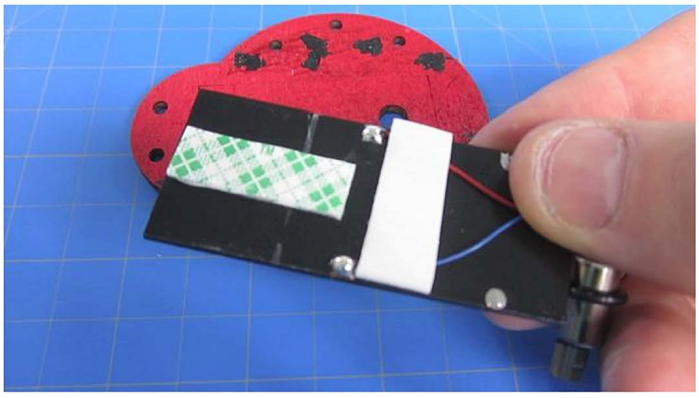
Next, push the motor into the body. Go from the top down.

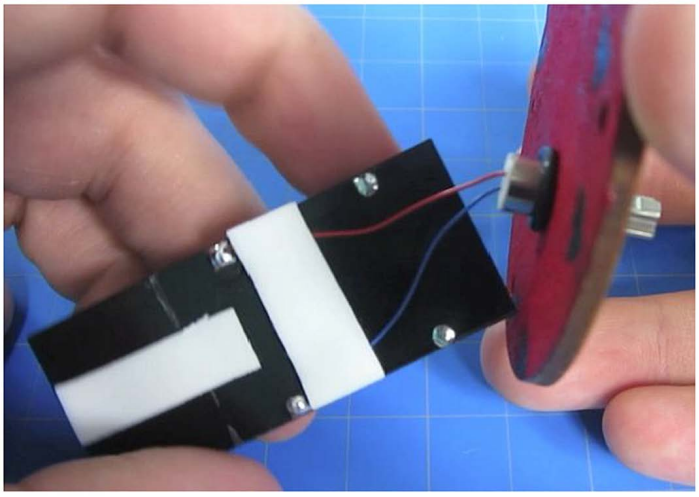
When the motor is most of the way through put a second o-ring onto the motor. The two o-rings work together to keep the motor in place. It sometimes helps to use the solar cell to push the motor down.

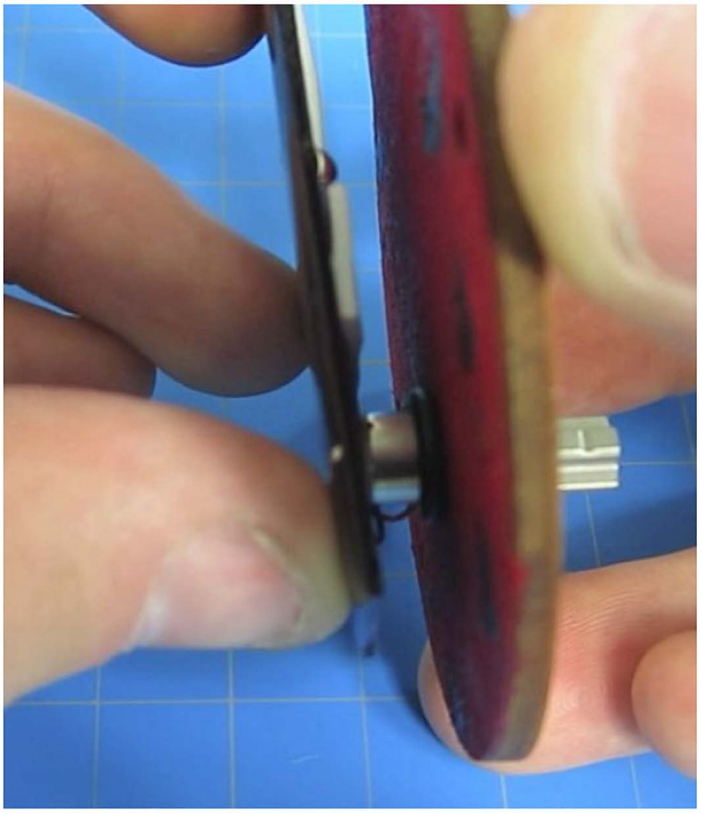
Once the motor is secure, remove the protective layer of the foam tape and press the solar cell into place.

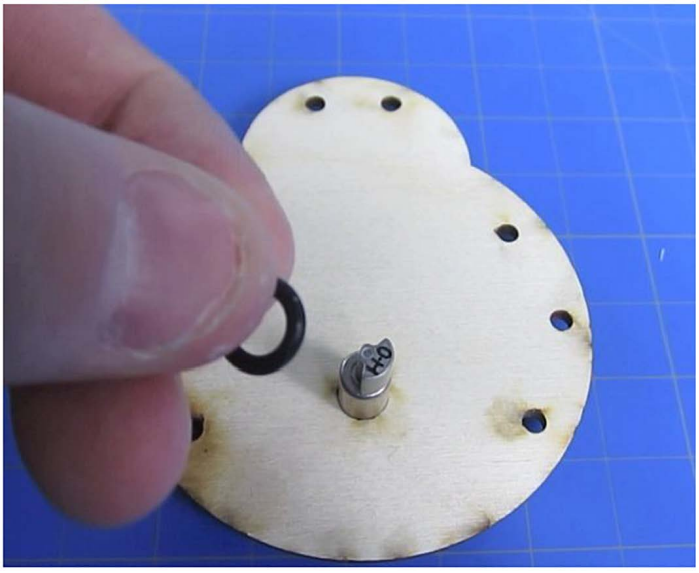


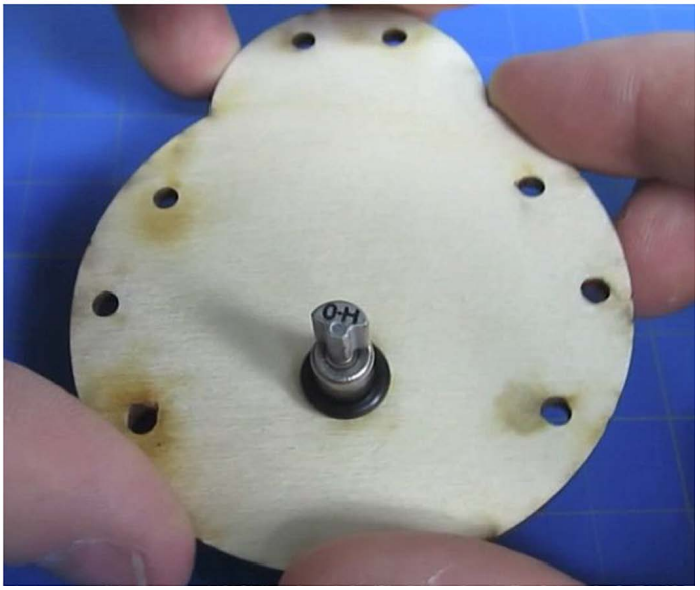












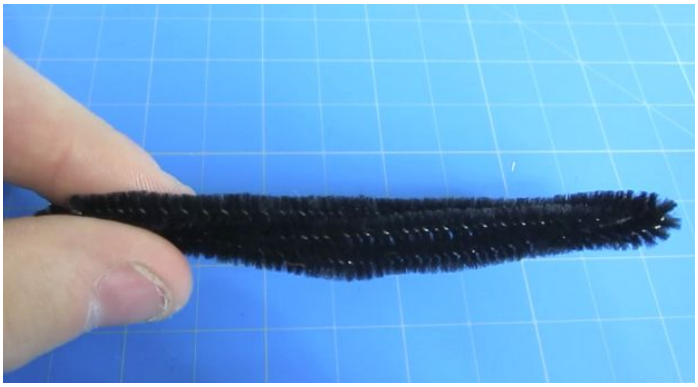
Step 4: Add Legs

Use the included pipe cleaners to make the legs for your Solar Bug.

Take one pipe cleaner and fold it into thirds. Cut at the folds.
Do the same to a second pipe cleaner.

Push one piece of pipe cleaner through a leg hole. Stick it through far enough so that you are able to twist it together and secure it. Make sure to twist it together very tight. The tighter the better!

Do the same for all six legs.



Step 5: Adding an Antenna And Eyes

Cut a strip of pipe cleaner in half.

Use the strips as antennas for your bug by inserting them into the pre-cut holes. Bend and twist them for a whimsical effect.

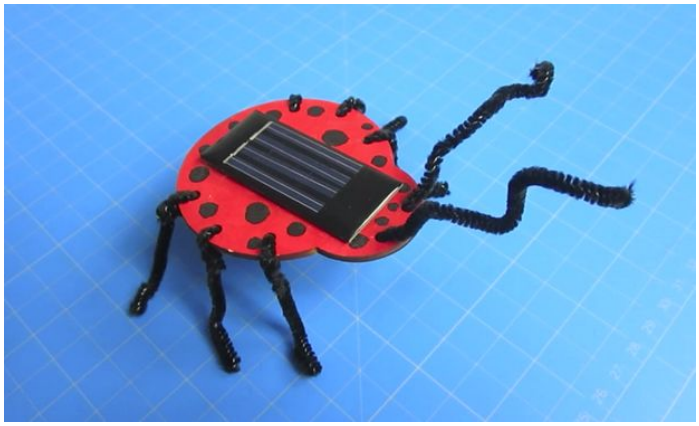
If you'd like to give you bug some eyes, peel off the back protective layer on your googley eyes and stick them on your bug.

Step 6: You're Finished! Now Have Some Fun!

Take your Solar Bug out into the sun and watch it in action. Smooth flat surfaces work best to watch it vibrate around. If your bug isn't moving much, try tightening up the legs. If that doesn't work, use solid core wire instead.

Also be sure to use direct, natural, unfiltered, sunlight. Artificial light will not work.*

That being said, read the next step about the classroom activity you can do using Solar Bugs to compare artificial light sources.



Step 7: Classroom and Learning Activities

The Solar Bug was originally designed for a 3rd grade classroom. This activity could easily be scaled up to middle school or high school levels by adding deeper critical thinking questions or adding extra light sources and/or filters on the light sources (such as sun glasses or UV protected glass).

In this step, I'm going to outline the classroom activity I had the students do.

Supplies:

- Bug Kits
- Paint & Paint Brushes
- Various Forms of Artificial Light
- Natural Sunlight

Questions for students to answer:

- Which is stronger, light from the sun or artificial light?
- Which source of light is strongest? How can we tell?
- Why does Sunlight cause a sunburn, but artificial light does not?

Activity Procedure:

Student will use the solar bugs as "sensors" to see which type of light makes the motor spin/ vibrate fastest. Students can either rate the light sources from 1-10, with 10 being the strongest source and 1 being no movement, or can make a list of strongest to weakest.

Place your light sources around the classroom. Label each station with a number or name, such as "Station 1: 60 Watt Lightbulb." It helps to have at least four types of artificial light and a window with natural sunlight coming through.

Have students (in pairs or individually) go from station to station. Depending on your classroom you may wish to give each student/pair a set amount of time at each station and then have everyone switch. This way, no station gets too crowded. If your students can handle going from station to station on their own, I highly recommend it. This allows students to go back to previous stations if they want to compare results.

When finished making their list, have them present it to the teacher to see if they have the right order. If not, have them go and do more testing.

When their order is correct have students return to their seat to answer additional questions.

Additional Questions:

- Which light source was the strongest? How were you able to tell?
- Besides the motor vibrating, what other ways were you able to compare light sources?
- Plants use light to make food. Which source of light would be best for feeding plants?
- Can people get sunburns from artificial light? Why or why not?
- Add in your own additional vocabulary or critical thinking questions!