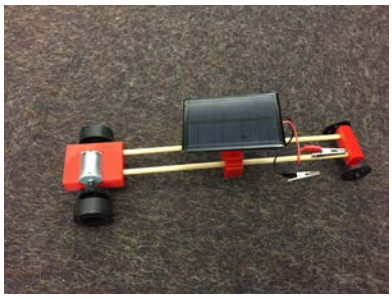
CLEAN ENERGY INSTITUTE
UNIVERSITY of WASHINGTON

SolarModCar

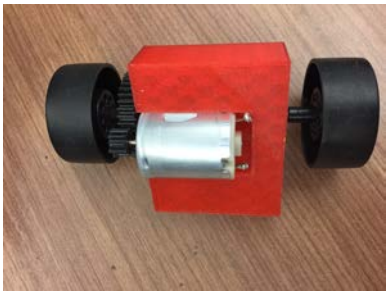


One of the most popular classroom activities conducted by The Clean Energy Ambassadors has been the solar car derby. Student experiment with different arrangements of solar panels on different car chassis. By the end of a busy event we found our cars were often wrecked. Motors broke loose, leads ripped from motors, and clip leads lost. Also we found students had a great interest in customizing the car beyond what our pre-built chasses allowed. So asked highschool intern Robert Winton to design a durable, modular car that we could use for our events and that could be 3D printed at school maker spaces. The SolarModCar was born.

The parts

1. Frame- two ¼ " hardwood dowels provides the strong structure on which the modules can be slid. This allow you have a very short car or very long car with multiple support and extra modules.

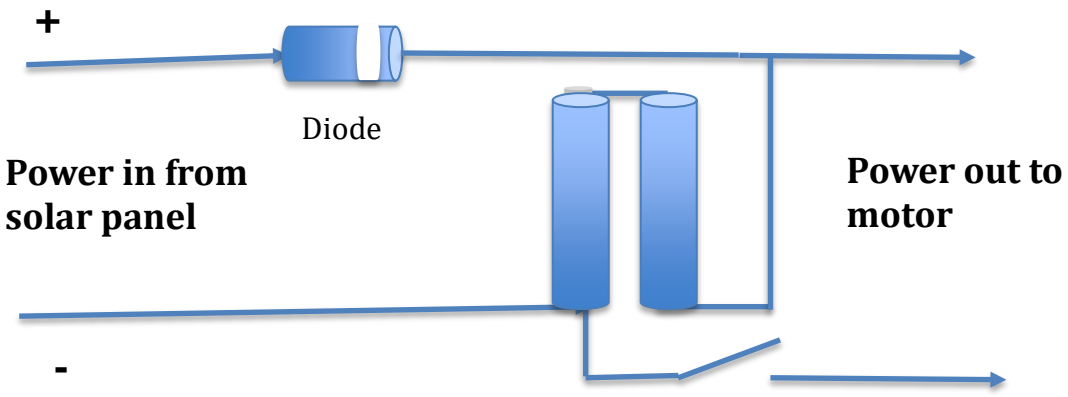
2. Front Wheel Module- Provides support and bearing for two whiles and 1/8" metal axel. The wheels, gears, axels and motor are available in a kit from Pitsco Sunzoon Lite Car for $12.75 each. The ends of the two frame dowels press into holes on the inside.
3. Motor Module- This has a hole into which the wired motor slides. The motor has a small gear which fits into a large gear on the read axle. To make ours more durable we solder wires on the motor and connected these to rigid bolts. pinched these under a nut and washer on a. Drill a hole top to bottom near each battery terminal, insert a 2" 10-24 bolt i from underneath, add a washer and nut, and pinch the battery wire under the washer and bolt. Student can now connect their solar panel alligator clip to the bolt which will not pull loose.



4. Solar panel support module. This slides in the middle on the two dowel. A simple block version can support a solar cell flat with Velcro. A variable angle mount version has a bracket with full rotation for altitude and azimuth so that the panel can be directed for maximum power for each run.
5. Battery Module- This contains a double AA battery holder, a diode and switch. Input wires bring power in from the solar panel to the battery or battery plus motor output. The diode prevents the discharge through the panel when the panel is shaded. The switch turns on the motor with battery

or battery+solar power. There must be batteries in the holder to make a complete circuit.




6. Assembly- Thread the modules you would like to use on to the two dowels. Place a wheel and motor module at each end. Connect your solar panel to the wire or bolts connected to the motor. Place it in the sun and see how it runs!

Materials

- Zoonlite Car kit from Pitsco- for wheels, gear, axle, motor and solar cell
- Diode http://www.goldmine-elec-products.com/prodinfo.asp?number=G9349
- Battery holder https://www.amazon.com/Ajax-Scientific-Battery-Holder-Lead/dp/B00EPQK55A/ref=sr_1_10?s=industrial&ie=UTF8&qid=1496854017&sr=1-10&keywords=aa+battery+holder 9.69 for 10
- Slide switch https://www.amazon.com/Amico-Solder-Position-Panel-Switch/dp/B008DFYL4K/ref=sr_1_3?s=industrial&ie=UTF8&qid=1496854248&sr=1-3&keywords=slide+switch
- ¼ " wood dowels
- 3D printer with PLA plastic, 3D CAD software and printer pre-press software