

Junior Solar Sprint Basic Car Design Instructions

Many teachers receive this box of supplies and don't know where to start. The JSS cars are easy and fun to build and with the added investigations into solar power, transmissions, friction and aerodynamics, they are very educational. These instructions are meant as a starting point, a way for you as the teacher to build a car before your students begin their investigations and modifications. This is by no means the only way to build a Junior Solar Sprint car, just a suggestion for getting one under your belt. The power point presentation found on the Watt Watchers of Texas website at <http://www.wattwatchers.org/pages/jsspresentations.htm> will walk you through these same instructions. An additional method for building the cars can be seen on the Power Point presentation on the National Renewable Energy Laboratory website at www.nrel.gov/education/jss_hfc.html.

Chassis- the car's frame

- Cut out a base that is a 11cm x 33cm rectangle
- Write front and rear at either end of the rectangle
- Draw a line 3.5cm in from either end of the base. This will be where you attach the axles.
- Cut out a notch on either side of this line to allow space for the wheel attachments (you are creating wheel wells).
- At the rear end of the base, draw a line perpendicular to the axle line about 4cm in from the side. Cut out this line (go 1 cm beyond the wheel line) so your hole is approximately 1cm wide. This space will accommodate the gear.

Solar panel riser- the car will run better if the solar panel is at an angle

- Cut a piece of construction material 17cm x 4 cm.
- Draw a line 4 cm in from each end
- Score along that line through 2/3 of the material
- Bend at the lines to form a U. Place this on the chassis in front of the notch made for the gear.
- Glue the riser to the chassis with the arms of the U pointing toward the front of the car. The lines you drew should be on the bottom of the car.
- Place the solar panel on top of the car and angle it down toward the front end of the car. Shave off the arms of the riser to reach your desired angle.
- Place a 2cm piece of "fuzzy" side (loop) Velcro® on top of the riser and at the front of the car.

- Place the solar panel on top of the car again, making sure that the metal connectors are at the rear of the car, and mark the bottom of the panel where the Velcro® should line up.
- Attach pieces of “scratchy” side (hook) Velcro® to the solar panel on your marks.
- Your solar panel may have some with Velcro® already attached. In that case, you would line up the Velcro® pieces of the solar panel with the riser before gluing it to the chassis.

Front Wheels and Axles

- Put the front axle and wheels together
- Create or attach bearings to the axle
- Flip car over and attach bearings to the chassis along the line you drew at the front of the car, making sure to allow the axle free rotation.
- Ideas for bearings:
 - o Use a piece of paper or cardstock to “bridge” the axle
 - o Fold a piece of tape over on itself and wrap around the axle
 - o Place the axle through a tube or straw and attach the tube to the chassis

Rear wheel assembly

- Place the axle through the largest gear and attach the wheels
- Line up the gear with the notch you made in the chassis
- Attach the axle to the chassis using the same method as the front wheels

Motor- using gear driven transmission

- Set the motor in the base by placing the shaft through the large hole and securing with a screw.
- Attach the largest gear to the shaft.
- Place the motor next to the gear attached to the rear wheel assembly so that it lines up with the gear.
- Attach the motor to the chassis

Connections

- Place your solar panel back on the car and connect the motor wires
- Place the motor wire leads in between the solar panel connectors and create a secure connection by placing a binder clip over each one.
- Expose to sunlight and test connections.

You have successfully built your first solar powered Junior Solar Sprint car. For more construction tips and troubleshooting advice, read the Inside Tips on Parts and Construction portion of your JSS materials. Happy Building!