

Ray Catcher Sprint Kit Instructions

If you are competing in the Junior Solar Sprint competition, Pitsco strongly encourages you to create your own design. The official JSS rule sheet is enclosed. Refer to the sheet when designing your vehicle.

The assembly instructions below are intended for those who are **not** participating in the Junior Solar Sprint competition. They represent one of many ways to assemble the vehicle.

Contents of Kit

Your kit includes the following items (the solar panel and motor are official parts required by the Junior Solar Sprint competition):

- 1 *Ray Catcher* solar panel (2.76 V, 1,100 Ma)
- 1 Motor
- 2 Alligator clips
- Solar Sprint Rules and Regulations
- Panel Warning Sheet

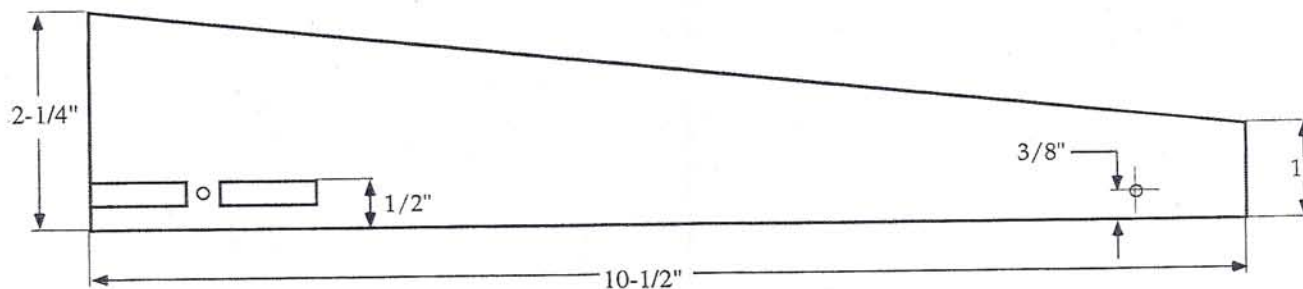
Additional Materials Required

Additional materials – chassis, wheels, and transmission – are needed to assemble a solar vehicle. The list below includes the additional items provided in the *Ray Catcher Sprint Deluxe Kit*, Pitsco #21211. You will need these or similar items to complete your vehicle.

- 1 Piece 14-ply coated paper (10-1/2" x 5")
- 2 Balsa sheets (10-1/2" x 4" x 3/16")
- 1 Aluminum axle (5-1/2")
- 1 Plastic gear font
- 4 Screw eyes
- 4 Pitsco GTF wheels

Body Rails

1. From one balsa sheet, cut two balsa body rails as shown in the diagram below. (Ignore the small rectangular strips on the left until Step 4.)
2. Lay one body rail on top of the other. Carefully align the edges of the rails, then pin them together. Now, drill 1/8" holes through the rails on the left and right, as indicated below. (Using a drill press is the preferred method.)



3. Separate the rails. Treat the holes with a thin glue, such as C/A glue*, as follows: Place a single drop of glue in each hole on both sides of the rails. This will harden the material surrounding the hole. Finally, run a 9/64" drill bit through the holes to make them slightly larger.
4. From the balsa scraps, cut four 1/4" x 1" strips. Use a low-temp glue gun to attach the strips to the rails as shown in the diagram on the previous page (two strips per rail).
5. Check to ensure that the axle holes are properly aligned by inserting the axles through both body rails. Remove the axles.

* cyanoacrylate ester – a quick drying hobby glue (sold as *Insta-Cure Glue*, Pitsco #56215)

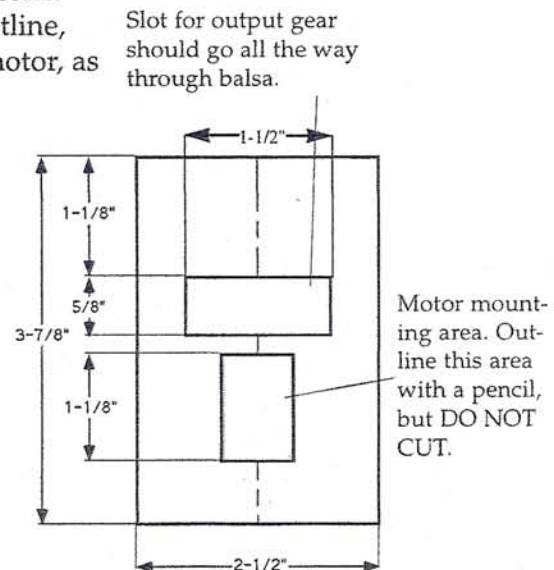
Wheels and Axles

Wheels and gears can be difficult to install on axles. Be careful not to bend the aluminum axle. To ease the process, you can first insert a 1/8" steel axle, 1/8" welding rod, or a 1/8" drill bit through the holes.

1. Mount one wheel on the end of each axle.
2. Pass the front axle through the holes in both rails. Install the wheel on the opposite end.
3. Using a felt tip marker, place a mark 2-1/2" from the end (with the wheel) of the remaining axle. Pass the opposite end of the axle through one of the body rails. Now, install the 1-1/4" output gear onto the axle, aligning it with the mark.
4. Pass the axle through the remaining body rail and install the wheel.

Drivetrain

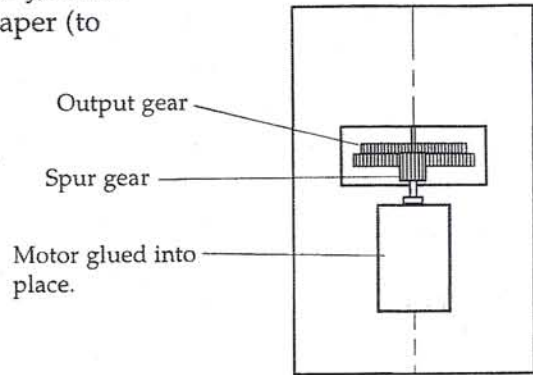
1. Cut a 2-1/2" x 3-7/8" motor platform from the second piece of balsa. CUT a slot for the output gear. Outline, but DO NOT CUT, an area the exact size of the motor, as shown.
2. Place the small spur gear onto the motor shaft.
3. Fill the outline of the motor-mounting area with glue from a low-temp glue gun. Press the motor into the glue and hold until it sets. Do not place glue in motor vent holes.
4. Set the motor platform into place on the strips inside the body rails. The motor should rest on top of the platform. The output gear should pass through the slot in the motor platform and engage the spur gear on the motor shaft (see diagram next page).



5. Rotate the spur gear to evaluate how the gears mesh. The gear teeth should engage adequately without binding. If necessary, make adjustments by shimming under the platform with paper (to raise the platform) or by trimming balsa material from the strips (to lower the platform).

Solar Panel

1. Place the coated paper on the table, and using a low-temp glue gun, glue the straight edges of the rails to the edges of the coated paper, with the balsa strips facing inside and upward.
2. Turn the car over so that the coated paper side is on top. Center the solar panel on the coated paper with the two leads at the back (wider end) of the rails.
3. Secure the panel to the coated paper by placing thumbtacks through the holes at the two ends or by using Velcro™ dots or double-stick tape.



Motor Connections

1. Solder the two wire leads on the solar panel to the two alligator clips. **Tip:** To protect the connection, place a dab of low-temp glue on the solder joint.
2. Connect the alligator clips to the two motor tabs.
3. Take the solar vehicle outside and expose it to sunlight. If the wheels do not spin in the proper direction, reverse the position of the alligator clips on the solar panel leads.