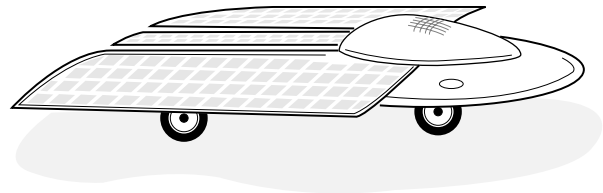


Photon Drive

The people have spoken! They are tired of parking meters, ridiculous parking fees, and awful lunch-time traffic! Buses solve half the problem, but what if you need to get from one side of downtown to the other in a hurry? Buses still get stuck in the noon-time traffic and they still pollute.



What a great opportunity for your mass transit company! You have recently decided to merge with a small solar energy company to develop a solar-powered tram. This car, called the *Arrow Transport*, would travel separate routes from one side of town to the other with stops in between. The system would reduce downtown traffic, pollution, and parking hassles.

Your company has put in a bid, but you must still compete with several other providers to get the contract. The city council will choose only the fastest and straightest-traveling vehicle for this project! You have until their meeting tomorrow to create your prototype. Good luck!

MATERIALS

- tongue depressor
- scissors
- plastic drinking straw
- bamboo skewer
- metric ruler
- 3 film canister lids
- 2 pencil erasers
- wood glue
- 1.5 V–3.0 V motor
- rubber bands
- hook-and-loop adhesive tape
- sheet of corrugated cardboard
- solar cells
- modeling clay
- 5 insulated wires with alligator clips
- aluminum foil

Objective

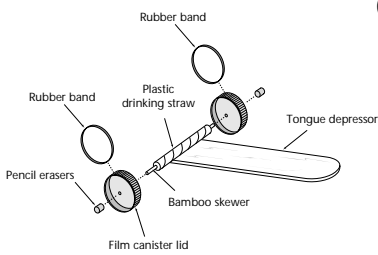
Construct a solar car to explore the use of an alternative fuel.

Procedure

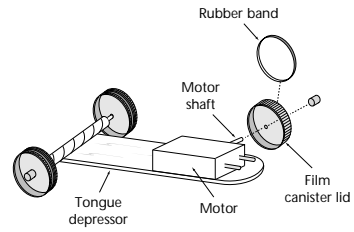
1. Cut the tongue depressor to three-fourths its original length. This will serve as the body of the car.
2. Cut the straw in half. Pull the loose fibers from the bamboo skewer to reduce friction, and place it inside the straw. Cut the bamboo skewer so that it is 2.5 cm longer than the straw piece. This will serve as the axle of the car.
3. Make tiny holes in the center of two of the film canister lids for the rear wheels. Pull the erasers off two new pencils. Connect a lid to each end of the bamboo skewer, and secure the lids in place with the erasers.
4. Glue the axle to one end of the tongue depressor so that it forms a T, as shown on the next page.
5. Mount the motor sideways on the other end of the tongue depressor, as shown on the next page. The motor shaft should be mounted so that it is parallel to the bamboo skewer at the opposite end.



Photon Drive, continued

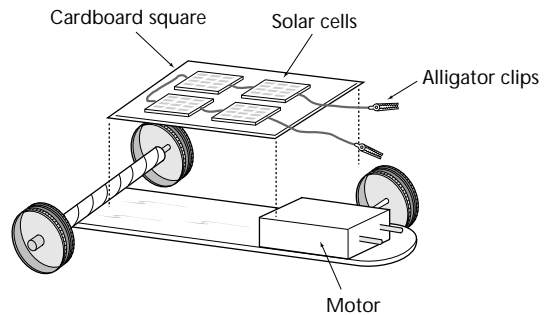


6. Cut a tiny hole in the middle of the third lid. Push the lid snugly onto the motor shaft so that it spins evenly. Glue the lid to the shaft to serve as the front drive wheel of the car. Center the front drive wheel in the front of the car. Tightly mount rubber bands on the wheels' edges to provide added traction.



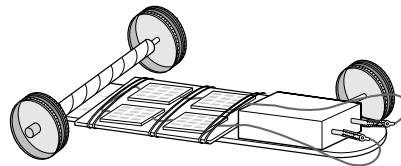
7. Congratulations! The car should now be able to roll along the floor supported by three wheels. No parts should drag.

8. Use hook-and-loop adhesive tape to mount the four solar cells side-by-side on the cardboard square, as shown. Then connect the solar cells with wires, as shown.



9. Use rubber bands to mount the solar cell unit on top of the tongue depressor. Use alligator clips to connect the free ends of the wires to the posts of the motor, as shown below.

10. Add enough modeling clay to the cardboard on the side opposite the motor to ensure that the car runs in a straight line.



Analysis

11. How could you modify your solar car to make it faster?

12. Modify your car so that it goes faster. Place your car on the starting line. At your teacher's mark, start your car and let it travel to the finish line.

