

## **Sun's Angle Investigation**

By Rick Butchart

**Objective:** To understand how the angle of the sun's rays affects the power of a solar panel.

### **Materials Needed:**

- Solar Panel
- Motor
- Straw
- Protractor
- Propeller
- Sunshine

### **Procedure:** (see Figure 1)

Assign students to complete this assignment as homework on a weekend at three different times of day (e.g., 8:00 a.m., 11:00 a.m., 2:00 p.m.). Alternately, you could have classes complete it during different periods of the day and share their data. Follow these steps:

1. Attach the propeller to the motor shaft.
2. Connect the motor to the solar cell.
3. Go outside and hold the solar cell level.
4. Count how many times per minute the propeller turns.
5. Hold the straw so it is parallel to the sun's rays and casts no shadow (other than a ring).
6. Measure the angle of the straw to the level plane (solar cell) using the protractor.
7. Note the angle, propeller turns, and weather conditions at each trial.
8. Repeat these steps on three separate days.
9. Calculate the average turns over the three days for each of the times the observations were taken.

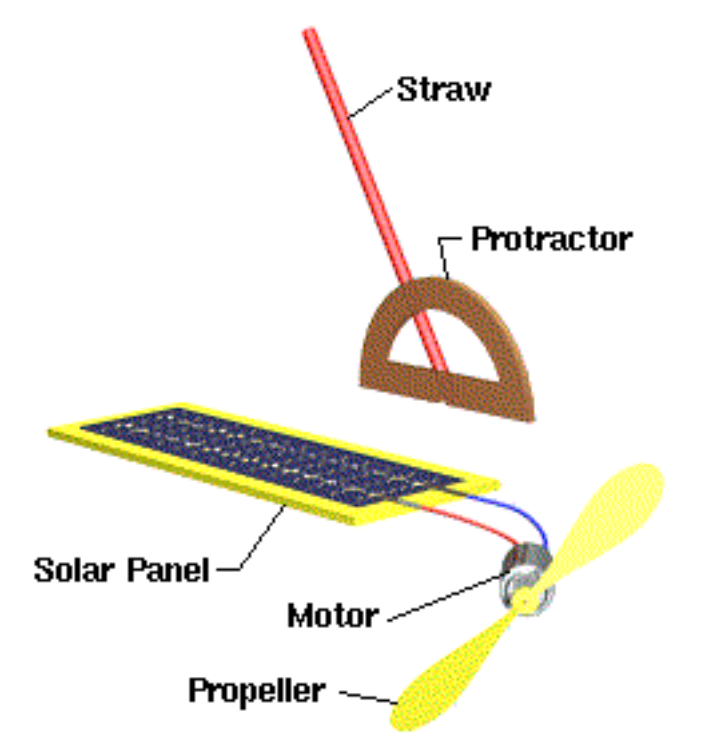
**Observations:**

At what time of the day is more power produced?

What weather conditions are most advantageous to the production of power?

What weather conditions are the least advantageous?

The angle of the sun is different at different times of the day and affects the power to your motor. Weather conditions also affect the power available. Make deductions based on your results, when the race will be held and your strategy in the design of your car.



**Figure 1:** Sun's angle investigation setup

Record the Number of Turns observed and the Sun's Angle at different times of day:							
Date	8am		11 am		2pm		Weather Conditions
	Turns	Angle	Turns	Angle	Turns	Angle	
<b>Average</b>							