Science Fair Report

Student 5A14

SSA Elementary School Science Fair

Solar Powered Car

Introduction

I wanted to find out if a solar-powered car goes fastest on sunny, cloudy, or dreary days. I tested the car in different kinds of weather to see how sunlight affects how fast it can go. I thought the car would go the fastest on sunny days because it gets more energy from the sun. This experiment helped me learn how solar power works in real life and how sunlight can make a solar car move better.

Purpose and Hypothesis

The purpose of this project is to see how sunlight affects how fast a solar-powered car can go. I tested the car at different times of the day and on a cloudy day to see which light conditions make it go the fastest. My hypothesis is that the car will go fastest on sunny days because it will get the most energy from the sun.

Materials and Methods

Material List:

- Balsa Wood
- Straws
- Wood Dowel
- Wheels
- Pulley Set
- Duct Tape
- Double Sided Tape
- Motor
- Zip Ties
- Rubber Band
- AA Batteries
- Battery Holder with Switch
- Photovoltaic Cell
- Alligator Clips
- Digital Multimeter

Procedures:

- Test 1 - 10AM - Put the car in the same place with the rear wheels just off the ground. Turn on the multimeter and measure the voltage across the solar cell. Run the car over the same distance measuring the time to pass between the two lines.Perform the same procedure each time but using the battery pack.
- Test 2 - 12PM - Put the car in the same place with the rear wheels just off the ground. Turn on the multimeter and measure the voltage across the solar cell. Run the car over the same distance measuring the time to pass between the two lines. Perform the same procedure each time but using the battery pack.
- Test 3 - 2PM - Put the car in the same place with the rear wheels just off the ground. Turn on the multimeter and measure the voltage across the solar cell. Run the car over the same distance measuring the time to pass between the two lines. Perform the same procedure each time but using the battery pack.
- Test 4 - 4PM - Put the car in the same place with the rear wheels just off the ground. Turn on the multimeter and measure the voltage across the solar cell. Run the car over the same distance measuring the time to pass between the two lines. Perform the same procedure each time but using the battery pack.

Night Time Procedures

- Test 5 - 7PM - Put the car in the same place with the rear wheels just off the ground. Turn on the multimeter and measure the voltage across the solar cell. Run the car over the same distance measuring the time to pass between the two lines.

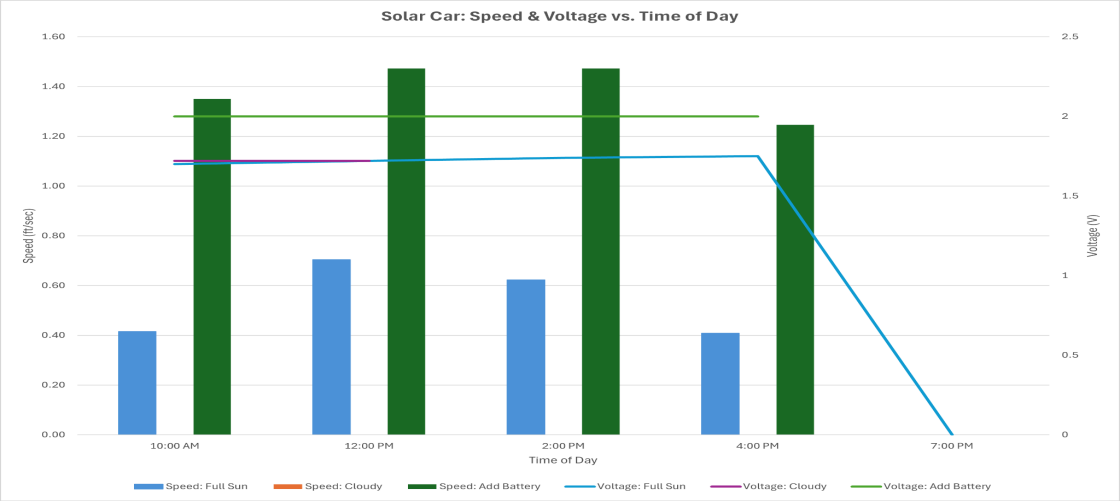
Cloudy Procedures

- Test 6 - 10AM - Put the car in the same place with the rear wheels just off the ground. Turn on the multimeter and measure the voltage across the solar cell. Run the car over the same distance measuring the time to pass between the two lines.
- Test 7 - 12PM - Put the car in the same place with the rear wheels just off the ground. Turn on the multimeter and measure the voltage across the solar cell. Run the car over the same distance measuring the time to pass between the two lines.

Data and Results

Data Table 1

	Time of Day	Conditions	Voltage	Time (sec)	Distance (ft)	Speed (ft/sec)
Test 1	10:00 AM	Full Sun	1.7	39	16.2	0.42
Test 2	12:00 PM	Full Sun	1.72	23	16.2	0.70
Test 3	2:00 PM	Full Sun	1.74	26	16.2	0.62
Test 4	4:00 PM	Full Sun	1.75	4.9	2	0.41
Test 5	7:00 PM	Dark	0	0	0	0.00
Test 6	10:00 AM	Cloudy	1.72	0	0	0.00
Test 7	12:00 PM	Cloudy	1.72	0	0	0.00
Test 8	10:00 AM	+Battery	2	12	16.2	1.35
Test 9	12:00 PM	+Battery	2	11	16.2	1.47
Test 10	2:00 PM	+Battery	2	11	16.2	1.47
Test 11	4:00 PM	+Battery	2	13	16.2	1.25



I tested the solar-powered car in different conditions to see how sunlight affected its speed. I tested the car in full sun at different times of the day, on a cloudy day, at night, and with a battery for comparison.

When the car was tested in full sunlight, it moved the fastest. The fastest speed happened around noon, when the sun was strong. During the morning and afternoon, the car still moved, but it was a little slower than at noon. As the sun got lower in the sky later in the day, the car's speed decreased.

On cloudy days, the car did not move at all. The power from the solar panel was very low, which showed that clouds blocked too much sunlight. At night, the car also did not move because there was no sunlight to power the solar panel.

When I used the battery pack, the car moved the fastest overall and had the highest speed each time. This showed that batteries give steady power, while solar power depends on how much sunlight is available.

Conclusion

The experiment shows that sunlight helps a solar-powered car go faster. When the sunlight was stronger, the solar panel made more energy and the car moved faster. The fastest time happened at noon when the sun was the strongest. When there was little or no sunlight, like on cloudy days or at night, the car did not move at all. This proves my hypothesis that a solar-powered car works best in strong sunlight.

Bibliography

Source 1

Title: https://www.energy.gov/topics/solar-energy

Summary: The article is about how to save solar energy and preserve it.

What's the big idea about the article? How solar energy is produced and used.

On this website, I found resources to learn what solar energy is; how people, businesses, and communities can utilize solar energy.

Source 1 Bibliography

"Solar Energy." *Energy.gov*, 2024, www.energy.gov/topics/solar-energy

Source 2

Title: https://www.nationalgrid.com/stories/energy-explained/how-does-solar-power-work

Summary: How Solar Power Works

What's the big idea about the article?

Solar power works by converting energy from the sun into power.

Source 2 Bibliography

National Grid. "How Does Solar Power Work?" *National Grid*, 16 May 2023, www.nationalgrid.com/stories/energy-explained/how-does-solar-power-work

Source 3

Title: https://www.homesciencetools.com/article/solar-car/?srsltid=AfmBOoqUJgXg8RcO

Summary: to help kids build a solar powered car

What's the big idea about the article? In addition, students will experience using hand tools as they construct their solar vehicle.

Source 3 Bibliography

"Solar Car Science Project: Learn How to Make a Solar Car at Home." *Home Science Tools*, 2025, www.homesciencetools.com/article/solar-car/?srsltid=AfmBOoqUJgXg8RcOosGACUGdutlBOoGiAMp1Xj_xtSaNeyXWNUivUCed