Science Fair Project

Table of Contents

Science Fair Contract, Topics, and Questions - Draft
Assigned: October 27th ___/200
Due: Nov 5th

Background research and Hypothesis
Assigned: Nov 10th ___/200
Due: Nov 17th

Materials, Procedures, and Variables
Assigned: Nov 20th ___/100
Due: Dec 2nd

Experiment, Results and Conclusion
Assigned: Dec.8th ___/200
Due: Dec 17 (Trial 1)
Jan 7th (Trial 2 & 3)

Rough + Final Draft Report
Assigned: Jan.12th ___/100
Due: Jan.27th

Final Project - Display Board Report
Assigned: Jan.12th ___/100
Due: Jan 27th

Science Fair topics template

TITLE A

Step-: 2 Project Ideas Proposal

Assigned: 10/27

Deadline: 11/05

1st Idea: Topic: Self-cleaning solar panel

(Please circle one: engineering/science)

2nd Idea: Topic: Natural vs. Artificial light for Plant growth - which is more efficient

(Please circle one: engineering/science)

Question: Do self-cleaning solar panels save energy compared to normal solar panels?

Resource(s):
https://www.rst-cleantech.com/blog/5-benefits-of-automatic-solar-panel-cleaning

Science Fair Topics - Draft

Write down the topic you chose:

- Self-cleaning solar panel: does it save energy?

What made you want to pick this topic?

- We've never seen a self-cleaning solar panel before, and we were wondering if it saves energy compared to a normal solar panel

Do you find these topics interesting? Why?

- We find solar panels interesting because they are an alternative energy source with many uses, and they are very prominent in the desert

Science Fair Topic and Question - Final

Which topic did you choose?

- Environmental effects on solar panels

What question(s) are you testing?

- What effects do weather, temperature, and reflectors have on the power outputs of solar panels?

How are you going to test your hypothesis?

- We will measure and compare the power output of two solar panels (6W, 20W) by running weather simulations using baby powder and dirt, and installing reflectors

Background Summary

Find information and record the sources you use that help you make an educated guess to your testable question.

Write a 1 paragraph summary for each of your sources.

Tip: Make your hypothesis after this is done

5 Benefits of Automatic Solar Panel Cleaning | RST CleanTech

Solar panels itself are a great source of energy. But also many solar panels don't get any maintenance which can cause for the energy to not be at its fullest. Regularly scheduled cleaning can increase how much power output by up to 30%. With an automated solar panel cleaning system it requires minimal maintenance

Step 3 Background Research Source 1

TITLE B

Source 1

Title:

Summary:

What's the big idea about the article?

In complete sentences, describe a few details (who, what, where, when, why, and how)

Source 1 Bibliography

If the source is a book, Title of the book:		
Author's Name:		
Date Published:		
Place Published:	Publisher:	Date Published:
Edition: (if applicable)		
Page Number(s):		

Background Research Source 2

If this source is a: _____ Magazine _____ Newspaper _____ Other **Title of the publication:**
Title of Article:
Author's Name:
Date Published:
Edition: Volume Number: Page Number(s): (if applicable) (periodicals or encyclopedias)

This source is a: _____ Website _____ Other **The URL is http://www.rst-cleantech.com/blog/5-benefits-of-automatic-solar-panel-cleaning** **Last Date of Access: Dec 12, 2025**
Title of Article: **5 Benefits of Automatic Solar Panel Cleaning**
Author's Name: **RST CleanTech Solutions**
Date of Article: **2022**

Science Fair Hypothesis

TITLE B

Hypothesis: Use your background research to help you create a HYPOTHESIS that predicts the outcome of your experiment

What is your Hypothesis?

Tip: Make your Hypothesis after the background research

The 20W panel in the sun with reflectors will have the highest power output, while the 6W panel in the shade covered with baby powder will have the lowest power output.

Materials

Make a list of all the Materials you used for this experiment

- 1 Coleman 6W solar panel
- 1 Solperk SK-M20W solar panel
- Water spray
- Towel
- Multimeter
- Baby Powder
- Aluminum Foil + Cardboard (reflector)
- Computer (to record data)

Make a list of all the Materials you used for this experiment

Procedure

What are the steps you followed during this experiment?

Write all of them down. Make sure they are exactly what you followed while doing the experiment.

1. Set up two similarly-sized (6W, 20W) solar panels next to each other on a table, facing straight up.
2. Set up a multimeter connection to the solar panels
3. When measuring voltage, connect the red and black probes of the multimeter to the red and black terminals of the panels respectively.
4. Follow the same steps for measuring current. The reading will be small (in microamps rather than amps) since there is no load in the circuit, but the relative differences will still be accurate
5. Measure voltage and current in all simulated environments

Variables

What are the Variables of your experiment?

Dependent Variable?

Energy output

Independent Variable?

State of solar panel (clean, powdery, foil, powder + foil, sunny, shady)

Control Variable?

Normal solar panel (no spray)

Testing the Hypothesis - Experiment

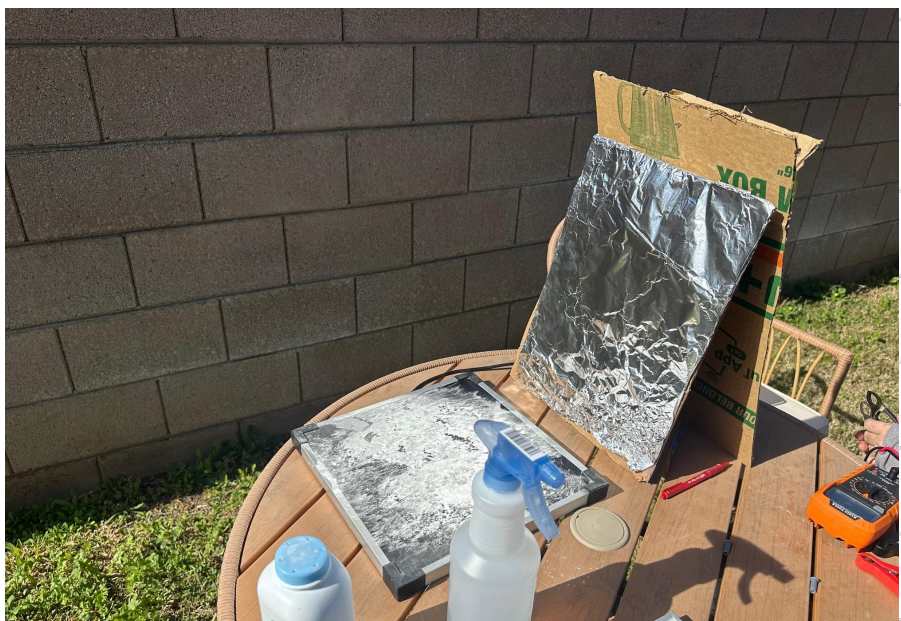
EXPERIMENT Collect and record data. Take pictures. Write everything in your science fair notebook, even mistakes and problems! Conduct your experiment multiple times to see if anything changes.

Data of experiments

panel	weather	State of panel	time	Voltage (V), avg	Current measured across the panel (not in series) (μA), avg	Avg Power (μW)
6w	sunny	clean	12;37	23.7, 23.7, 23.7, 23.7	9.4, 9.5, 9.4, 9.433	223.5621
6w	sunny	foil	12;40	23.7, 23.7, 23.7, 23.7	11.3, 11.3, 11.2, 11.267	267.0279
6w	sunny	powder	12;24	23.6, 23.7, 23.7, 23.667	4, 4, 4, 4	94.668
6w	sunny	Foil + powder	12;27	23.8, 23.8, 23.7, 23.767	5.2, 5.2, 5, 5.133	121.966011
6w	shady	clean	11;46	21, 21.2, 21.3, 21.167	0.3, 0.4, 0.3, 0.333	7.048611
6w	shady	foil	11;57	21.5, 21.4, 21.5, 21.467	0.5, 0.5, 0.5, 0.5	10.7335
6w	shady	powder	12;07	21.1, 21.1, 21.1, 21.1	0.1, 0.1, 0, 0.067	1.4137
6w	shady	Foil + powder	12;11	20.8, 20.8, 20.9, 20.833	0.1, 0, 0.2, 0.1	2.0833
20w	sunny	clean	12;31	21, 21, 21, 21	49.1, 49.4, 49.2, 49.233	1,033.893
20w	sunny	foil	12;35	20.9, 20.9, 20.9, 20.9	60.7, 61.1, 62, 61.267	1,280.4803
20w	sunny	powder	12;17	21.6, 21.5, 21.5, 21.533	31.8, 31.9, 32.1, 31.933	687.613289
20w	sunny	Foil + powder	12;21	21.3, 21.2, 21.2, 21.233	41.5, 42.1, 41.5, 41.7	885.4161
20w	shady	clean	11;50	18.13, 18.12, 18.13, 18.1267	2.8, 2.9, 2.9, 2.867	51.9692489
20w	shady	foil	11;54	18.21, 18.21, 18.23, 18.2167	3, 3, 3, 3	54.6501
20w	shady	powder	12;01	17.78, 17.88, 17.91, 17.8567	2.6, 2.6, 2.6, 2.6	46.42742
20w	shady	Foil + powder	12;04	17.83, 17.83, 17.84, 17.833	2.4, 2.4, 2.4, 2.4	42.7992

Testing the Hypothesis - Experiment

EXPERIMENT Collect and record data. Take pictures. Write everything in your science fair notebook, even mistakes and problems! Conduct your experiment multiple times to see if anything changes.

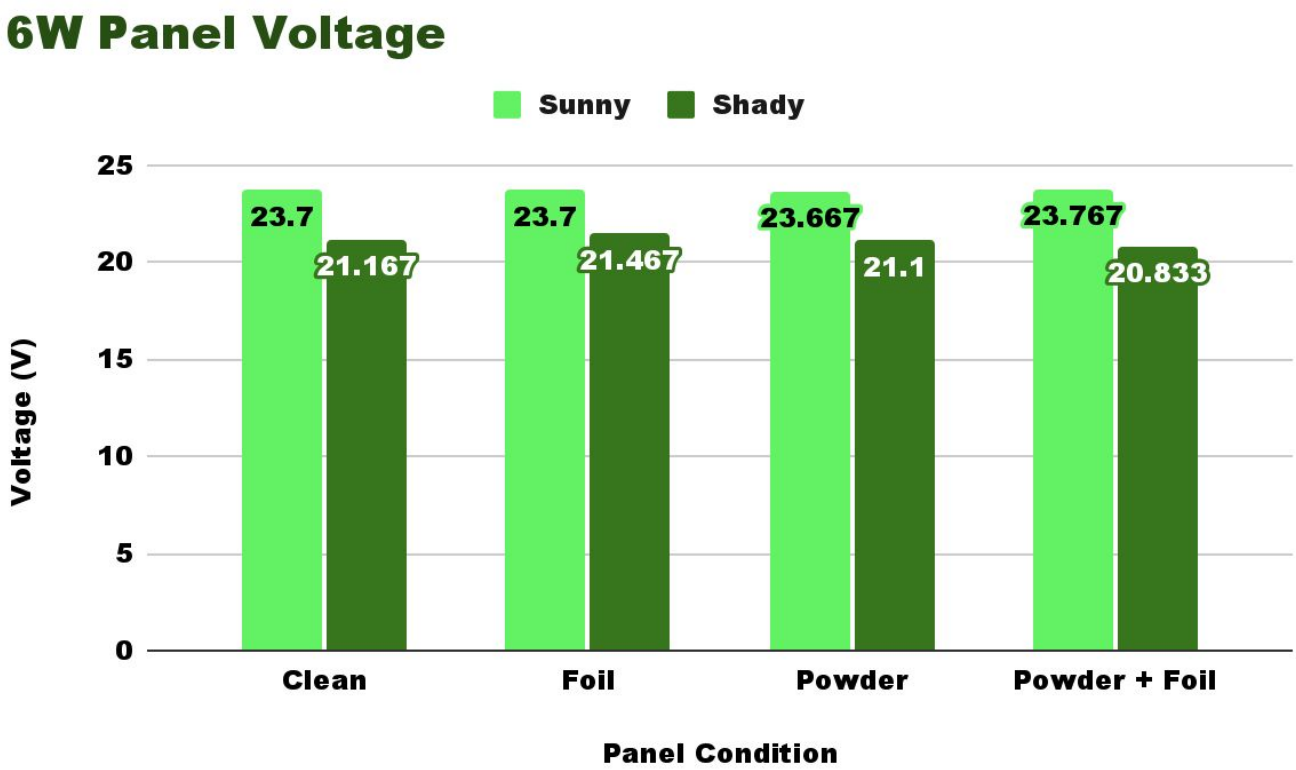


TITLE D

Results

Put your data into graph form and study you graph to see what kinds of trends you notice.

Our results are supporting the hypothesis. Our hypothesis was correct and the data that was gathered can explain why. Some of the noticeable trends is that the voltage isn't affected by the condition of the panel, but more on how much the sun is hitting the panel.



Conclusion

Based on your results, what was the outcome?

We were able to notice how the voltage was affected more by how much sun was hitting the panel then the conditions of the panel

Does your data show that your hypothesis was correct?

Yes it does

What kinds of problems did you have?

What would you do differently next time?

Rough Draft Report

You will use all the information from above to put together a rough draft report.

TITLE

Final Draft Report

Go back to your Rough Draft Report and fix any mistakes.

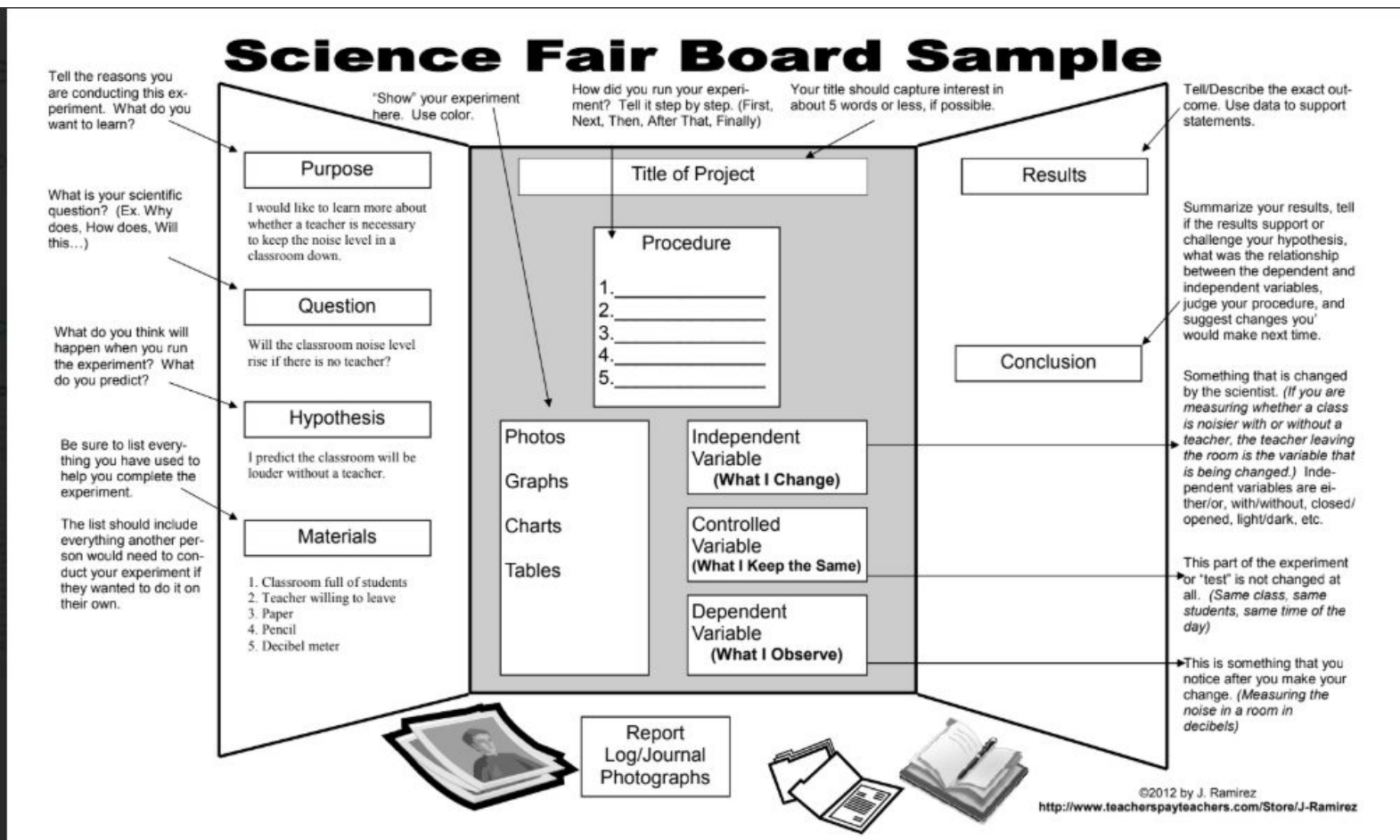
Ask a teacher for their opinion.

Make final changes.

The results are supporting the hypothesis that the 20W solar panel exposed to direct sunlight with reflectors would produce the highest power. We were able to notice how many of the independent variables had an impact on the power output. The data proved that our hypothesis was correct. A trend that was the most noticeable was that voltage was affected by how much sunlight was getting to the panel that the condition of it.

Final Project - Display Board Report

Make a Trifold Poster Board

Have it include all the components you have included in this Binder so far.

Your Finished Poster Board should look something like this: