

# The Effect on the Electrical Load on the Temperature of the Solar Panel



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## Background Research

- The three measurements used in this experiment are volts, amps, and watts. Volts is the difference in electrical potential, amps is measure of electric flow, and watts is the unit in which electricity is measured. In this experiment, the measure of power is equal to volts multiplied by amps.
- When a ray of light hits the silicon solar cell it knocks an electron off and with the help of a conductor, the electron flows into the circuit and generates electricity.
- The electrical load refers to the energy removed from the solar panel.

## Testable Question

What is the effect of the electrical load on the temperature of the solar panel?

## Hypothesis

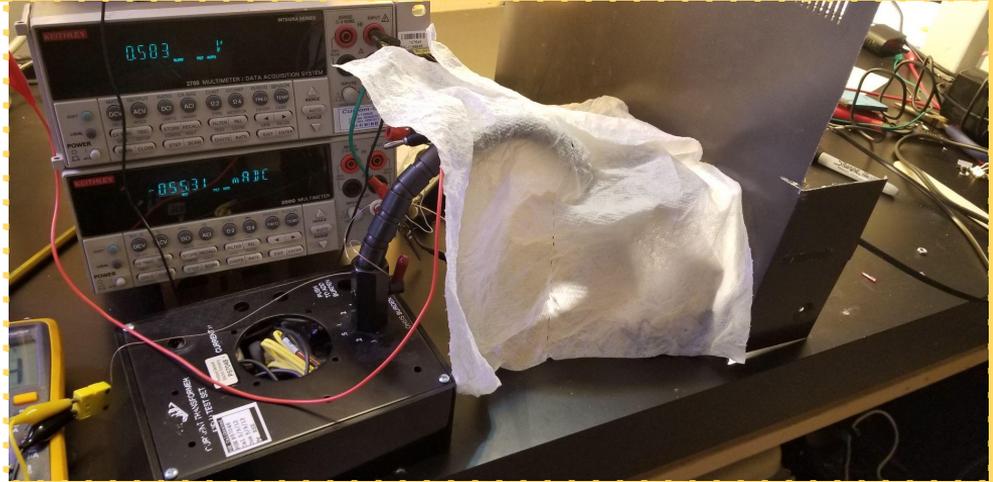
The greater the electrical load is the lower the temperature will be. I think this because according to the Law of Conservation of Energy, "Energy cannot be created or destroyed" would mean that since more power is being removed from the solar cell, the temperature should go down because there is less energy.

# Materials

1. Volt meter
2. Amp meter
3. Thermocouple
4. Variable resistor
5. Light bulb (30 watts)
6. Silicon solar cell
7. Calculator
8. Timer

# Procedure

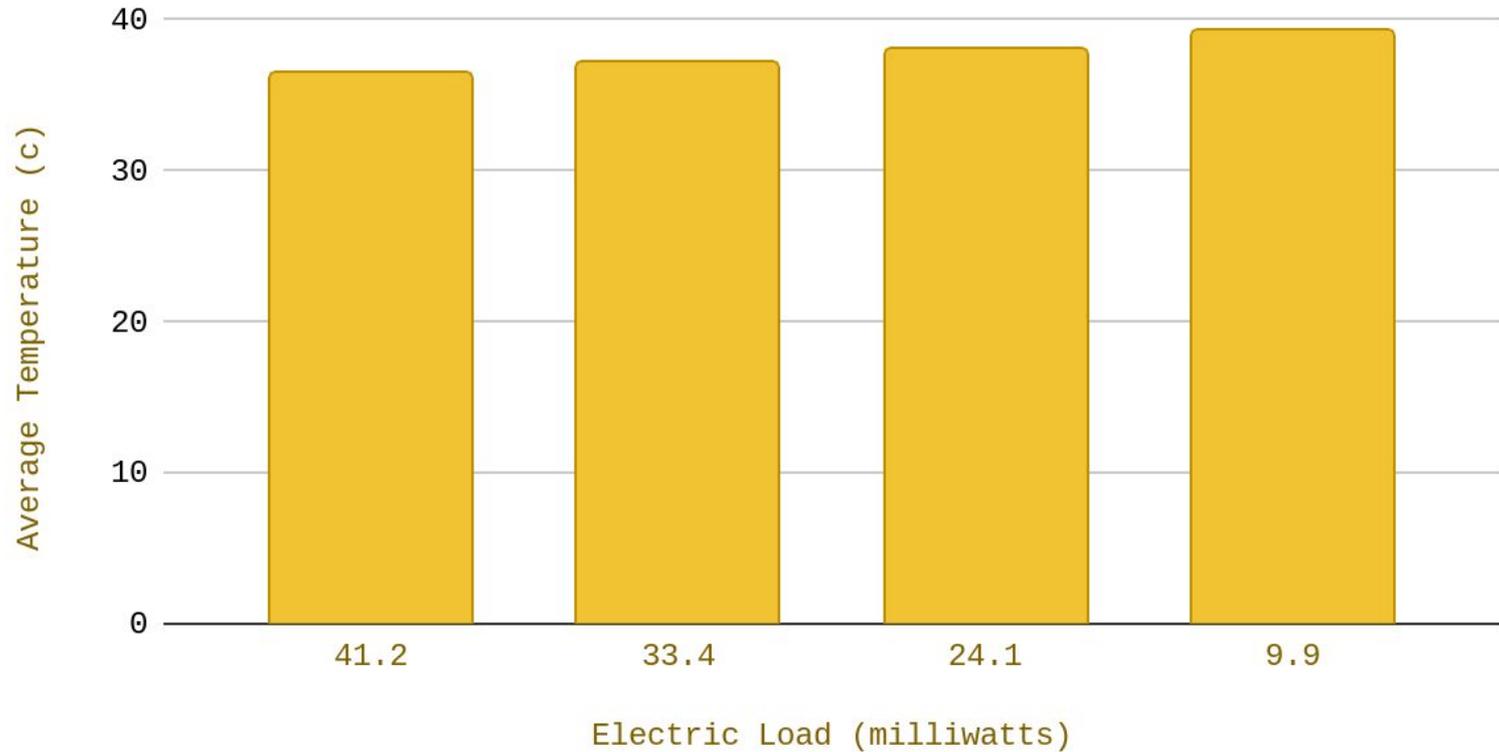
1. Hook up wires to machine (thermocouple/voltmeter/amp meter attached to solar cell by wires)
2. Set resistor to desired number then wait 40 seconds
3. After 40 seconds, record volts, amps, and temperature, and find power
4. To find power multiply volts and amps
5. Set resistor to another number and repeat
6. **\*SAFETY PRECAUTIONS\***
  - DO NOT have water near the experimental setup
  - MAKE SURE to unplug all systems after use



# Data

Electric Load/Power Extracted (milliWatts)	Cell temp (celsius) Trial 1	Cell Temp (celsius) Trial 2	Cell Temp (celsius) Trial 3	Average Temp (celsius)
41.2	36.4	36.5	36.6	36.5
33.4	37.3	37.2	37.1	37.2
24.1	38.1	38	38	38
9.9	39.4	39.1	39.4	39.3

## Average Temp (celsius) vs. Electric Load/Power



## Analysis

The higher the electric load the lower the temperature of the solar panel was. When the electrical load was 41.2 milliwatts, the solar panel reached its lowest average temperature of 36.5 degrees celsius. When the electrical load was 9.9 milliwatts, the solar panel reaches its highest average temperature of 39.3 degrees celsius. This results are a product of The Law of Conservation of Energy, since energy is being extracted from the solar cell, the temperature went down because there was less energy. Possible Sources of error include technical errors with the machines that I used to record temperature, volts, and amps.

## Conclusion

The higher the electric load the lower the temperature of the solar panel was. In future experiments, I would perform more trials and do the experiment in a more temperature controlled environment.

## Citations

Dhar, Michael, and Alisa Harvey . “How Do Solar Panels Work?”  
*LiveScience*, Purch, 11 Feb. 2022, [livescience.com](https://www.livescience.com)