Name:
Company:
Period:

Solar Energy Phase III:
Design Optimization
(Round 2 – Solar Elevation Angle)

Independent Variable:

IV: Solar Elevation Angle (i.e. tilt)

How will you measure the IV? Download the free app called "Angle Meter Free" or use a protractor.

Dependent Variable (aka Criteria):

DV aka Criteria: power output in watts

How will you will you measure the DV? Power can be calculated by using P=IV.
    What does "I" stand for in the equation P=IV? _____
    How can you measure I?_____
    What does "V" stand for in the equation P=IV? _____
    How can you measure V? _____

Control Variables:
What must be held constant in this experiment?

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Data Collection:
Collect data to drive your design decisions

Reminder: to measure VOLTAGE...
1. Leads are plugged into COM and VΩmA
2. Dial set to DCV 20

Reminder: to measure CURRENT...
1. Leads are plugged into COM and 10ADC
2. Dial set to 10A

RAW DATA TABLE:

IV: Solar Elevation Angle (°)	DV: Power (W)					
	Voltage (V)			Current (A)		
	Trial 1	Trial 2	Trial 3	Trial 1	Trial 2	Trial 3

CALULATED DATA TABLE:

IV: Solar Elevation Angle (°)	DV: Power (W)		
	Voltage (V)	Current (A)	Power (W)
	Average	Average	Average

P=IV

GRAPH:

Average Power (W)

Solar Elevation Angle (°)

Title

Optimal Level:

Look at your graph. What is the optimal solar elevation angle to maximize power?

Look up the latitude of your city. (https://www.esrl.noaa.gov/gmd/grad/solcalc/azel.html)

Latitude is _____.

How does this latitude compare to your optimal solar elevation angle?

Why does this make sense? Check out this link: bit.ly/SunMoves.

How might the optimal solar elevation angle change ...in the summer?

...in the winter?

Design:

What season is your stakeholder most likely to use the solar panels? (example: a skier will likely use a solar panel in the winter)

What is the optimal angle you would recommend to your stakeholder.

Brainstorm how you could design your charger and instructions manual to keep the optimal angle.