



Name:

Company:

Period:

# Solar Energy Phase III: Design Optimization (Round 1 – Azimuth)

4 Phase Engineering Design Process



## Design Sketch:

Sketch the circuit diagram for the solar cell phone charger. (You may want to reference Phase 2)

## Independent Variable:

IV: azimuth measured in degrees

How will you measure the IV? Most phones come with a compass app already installed on it. However, if you don't have a compass app, please download one for free.

## Dependent Variable (aka Criteria):

DV aka Criteria: power output of solar panel 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?

- 
- 





**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: Azimuth (°)	DV: Power (W)					
	Voltage (V)			Current (A)		
	Trial 1	Trial 2	Trial 3	Trial 1	Trial 2	Trial 3

**CALCULATED DATA TABLE:**

IV: Azimuth (°)	DV: Power (W)		
	Voltage (V)	Current (A)	Power (W)
	Average	Average	Average

P=IV



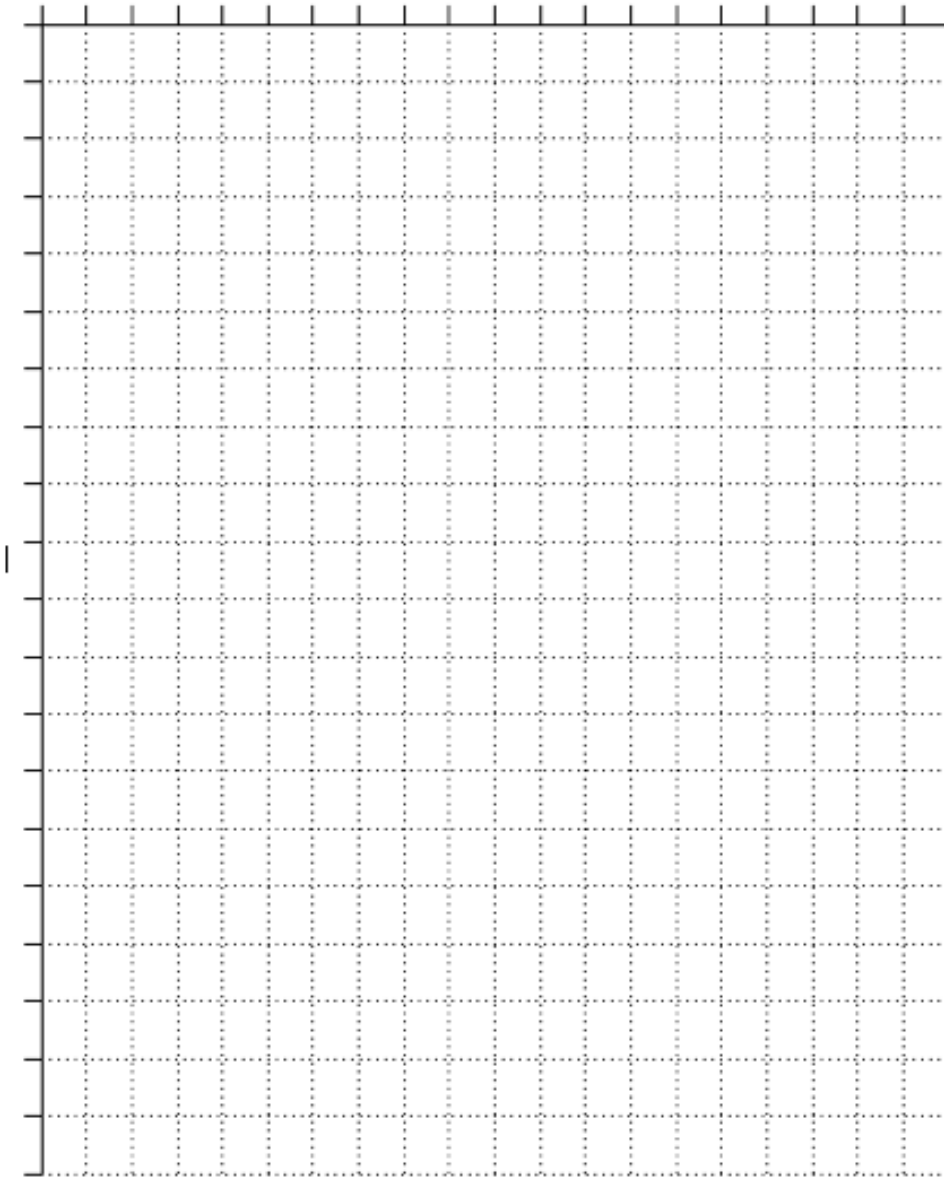


Average Power (W)

**GRAPH:**

Azimuth (°)

Title





## Optimal Level:

Look at your graph. What is the optimal azimuth angle to maximize power of a solar panel?

Attempt to explain the scientific reasoning behind your results? Any limitations to your results?

The optimum azimuth for \_\_\_\_\_ is \_\_\_\_\_  
*(Stakeholder's proposed use)*

because:

## Design:

How will your stakeholder make sure the solar cells are at the optimal azimuth? How can your design and/or directions help communicate this concept? Use the space to explain or draw a diagram.

