

# Solar Cell I-V Curve Investigation Practice Assessment

Thomas Bass

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## Part I

## The Plan

### 1 Working Title

the working title of the investigation

An investigation to show the I-V Characteristics of a Solar cell

### 2 Aim

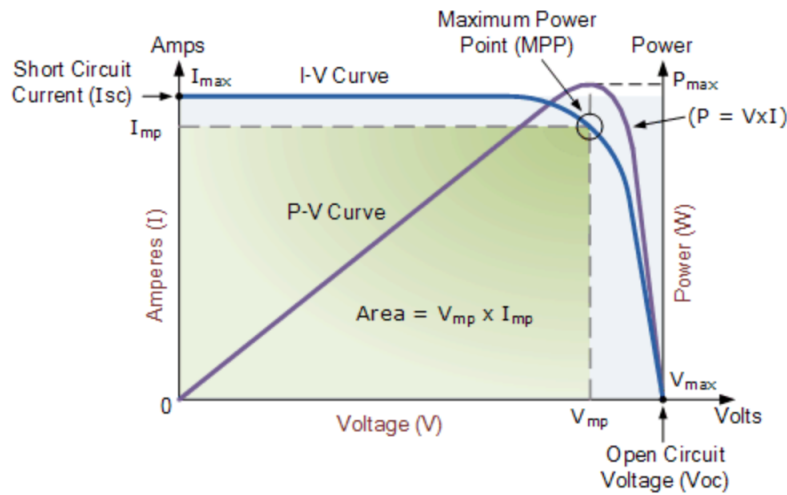
the aim of the investigation

This investigation will

1. Investigate the change of potential difference and current as the external resistance changes
2. Investigate this with different intensities

### 3 Reaserch

As this invetigation is to find the I-V charachteristics of a solar cell, I found an article explanining the predicted I-V Curves of solar cells. The article explains the general shape of an I-V Curve of a solar cell, which can be approximated by a reflected log curve, as seen in the graphic below:



## 4 Initial Experiments

an outline of the initial experiments

For ease of recording, we want the apparatus to return values that can be accurately and quickly recorded. This means we want the equipment to return values between 0 and 999, and no more than two decimal places

- Find appropriate sensitivity settings for the ammeter and voltmeter
  - First, the solar cell was set up on a clamp stand, and the circuit constructed
  - Then, the lamp was turned on and the light meter placed next to the solar cell
  - The resistor was then closed to its lowest resistance, and the voltmeter sensitivity was set to the correct level. The lowest resistance will result in the highest voltage, so we set the voltmeter so that the greatest value of resistance is not more than the sensitivity level is capable of showing
  - The resistor was then opened to its greatest resistance, and the ammeter sensitivity was set in the same way as the voltmeter, as the highest resistance will result in the highest current
- Find appropriate variable resistors to use
  - Once the Rheostat had been used, other potentiometers were provided

- To see if the range of resistance for these was appropriate, each was connected to the current setup, and the maximum and minimum resistance was tested to see if the experiment could provide useful data with the sensitivity options provided by the multimeters
- The  $100\Omega$  and  $400\Omega$  variable resistors were rejected as they would not provide useful results, but the  $50\Omega$  and  $10\Omega$  were used

## 4.1 Initial Experiment Results

Table 1: Initial Experiment Results

Resistor Setting	Potential Difference	Current
Open (minimum)	105.0	123
Closed (maximum)	0.0	442

These results show that the sensitivity settings are correct, as the maximum results are within the range of the multimeter, and give results to a suitable decimal place.

## 5 Apparatus

a list of the required apparatus

1. Solar Cell
2. Clamp stand
3. 2x Multimeters for Voltmeter and Ammeter
4. Desk lamp
5. Light Meter
6. Crocodile clips and cables
7. Rheostat and Potentiometers

## 6 Initial Diagram

a diagram of the initial experiment

## 7 Risk Assessment

a risk assessment

## 8 Timeline

a rough breakdown of how the two-week period of intensive practical work will be spent

## Part II

# The Report

## 9 Aim

a statement of aim

This investigation will

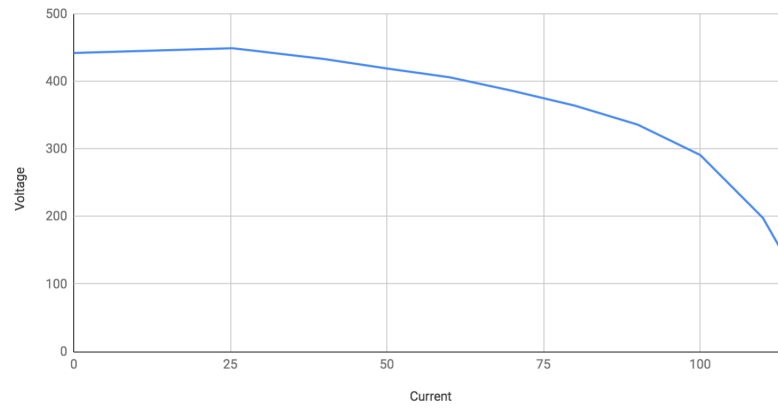
1. Investigate the change of potential difference and current as the external resistance changes
2. Investigate this with different intensities

## 10 Results

Table 2: Measuring change in Potential Difference and Current with change in Light Level

320,000 Lux		120,000 Lux		50,000 Lux	
Current	PD	Current	PD	Current	PD
<i>200m</i>	<i>2</i>	<i>200m</i>	<i>2</i>	<i>200m</i>	<i>2</i>
114	133	54.3	62	24.2	28
110	198	52.7	234	24	43
105	123	48.1	340	23.9	145
100	291	41.2	395	23.4	211
90	336	35.2	423	22.7	262
80	364	30.9	437	21.8	298
70	386	28.3	444	21	320
60	406	26.6	448	20.2	338
50	419	25.4	451	19.7	350
40	433	0	495	0	473
30	444				
25.3	449				
0	451				

I-V Curve for 320,000 Lux



## 11 Summary

a word-processed summary of approximately 300 words written after completing the project, including an outline of any changes from the original plan