Part 1a - resistance of a light-bulb

Procedure and Goal

We have a light-bulb. We send varying amounts of current through the light-bulb. We then measure the voltage across the light-bulb for each current. Our goal is to see if the the resistance of the light-bulb is dependent on the current supplied to it.

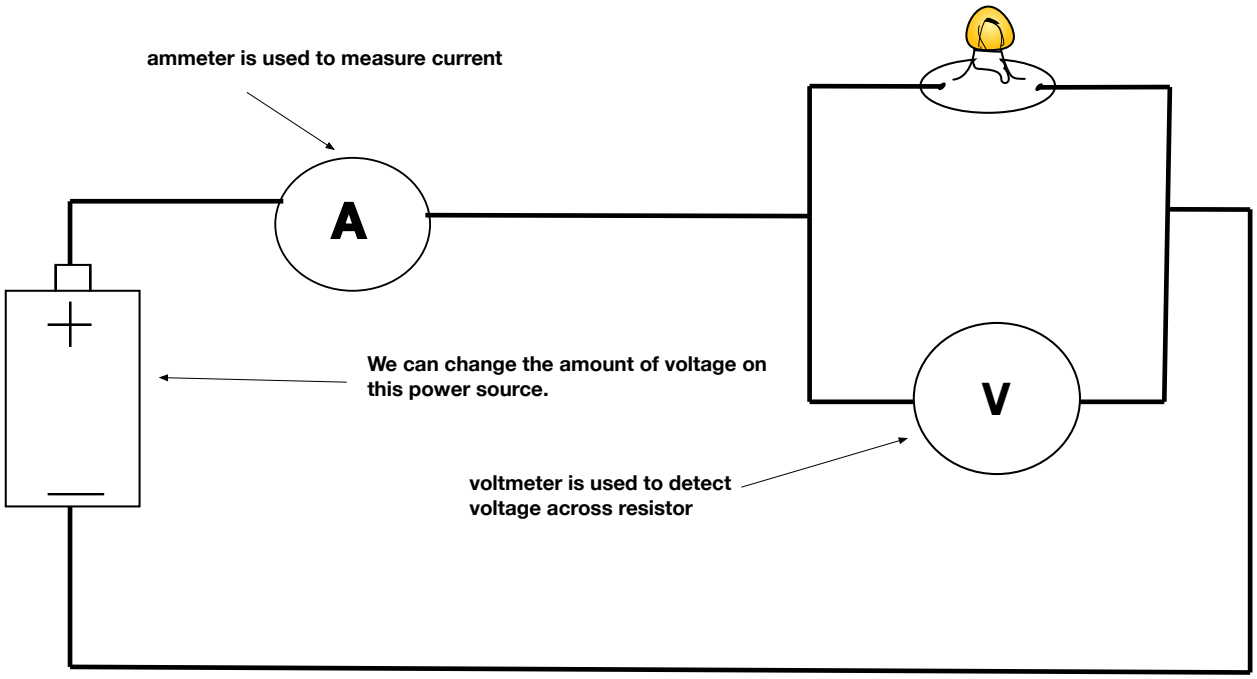

Figure 1: the circuit of our experiment

Prediction

We can follows these steps to show more current ⇒ more resistance

1. More current ⇒ brighter light-bulb
2. brighter light-bulb ⇒ more heat
3. more heat ⇒ more resistance

4. therefore we can conclude more current ⇒ more resistance

we can say more current ⇒ more resistance but can not guess the exact relationship between the current supplied and resistance

Results and Analysis

Here are the results we achieved.

current supplied	voltage across light-bulb	resistance of light-bulb
.03	.39	13
.04	.67	16.75
.05	.98	19.6
.06	1.5	25
.07	1.93	27.5
.08	2.5	31

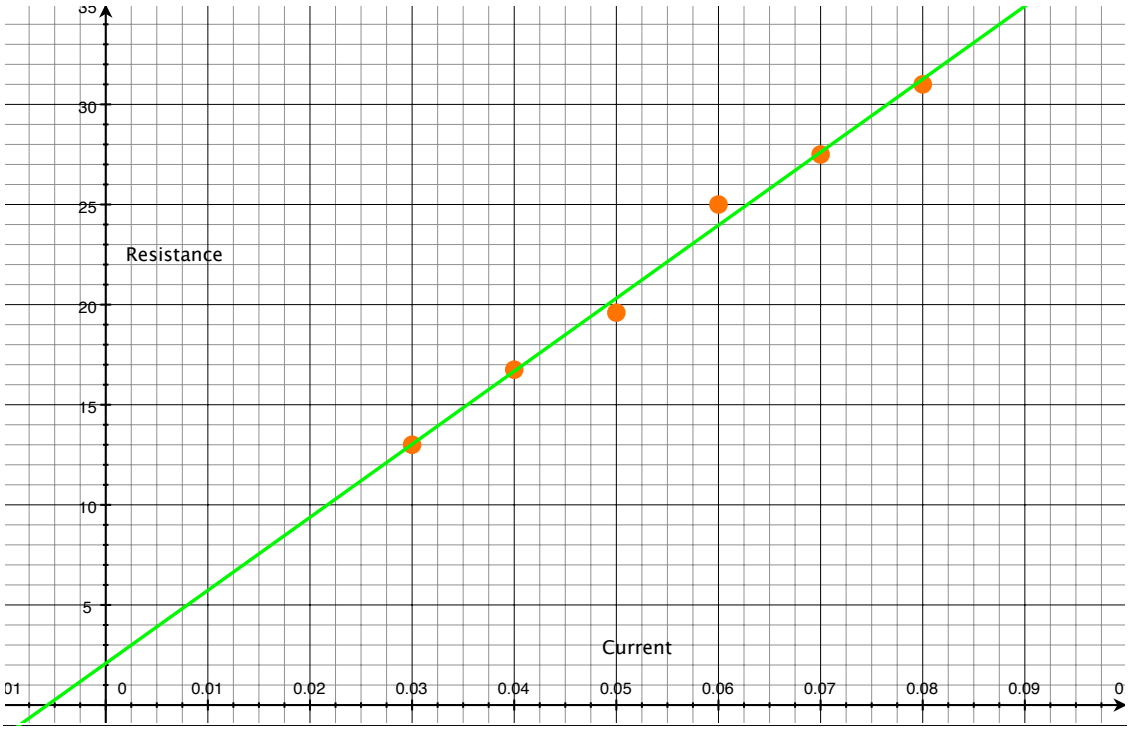

Figure 2: plotting the resistance as a function of current

Our prediction was correct.We found out that the resistance of the light-bulb is directly proportional to the current supplied. The best fit curve we got was $R = 364.71I + 2.08$.

Part 1b - ohmic resistance

Procedure and goal

In this part we repeat part 1a except we replace the light-bulb with a resistance box. We set the box's resistance to 50.

Prediction

Since by the box has a fixed relationship, there should be no relation between current and resistance. Resistance should stay fixed at 50.

Results and Analysis

current supplied	voltage across light-bulb	resistance of light-bulb
.02	1	50
.03	1.7	56.6
.05	2.5	50
.06	2.9	56.6
.07	3.4	55.71
.08	4.3	53

In the second part of this experiment our prediction was correct. The resistance recorded stayed at around 50, so the box is an ohmic resistor.