Physic 2126Electric Potential
July 7, 2015
Courtney Kimbrough
Lab Members:
Courtney Kimbrough – Reading the multi- meter
Ayres Allison – plotting points
Zack Husteth – Setting up of the materials

I. Purpose

In this experiment we will be investigating the relationship between the equipotential surfaces and the electric field lines that correspond to similar estimated voltages.

II. Theory/Introduction :

Using the reaction to map out lines of equal potential, and using specific equipment to map out the electrical field that corresponds with the same significant voltage

III. Procedures

1. Setup the equipment as shown above. Place a piece of plain paper beneath the conducting paper. Make sure both papers are pressed flush with the cork board. DO NOT TURN ON THE POWER SOURCE YET. Make sure the voltage and current dials are turned all the way down before you turn the power source on.
2. You should connect the wires to the D.C. terminals.
3. Push the pins all the way through so the head is in good contact with the paper. This will give you a better connection.
4. Connect the pins to the power source using alligator/banana connections, one to the positive terminal and one to the negative terminal. Make sure the pins go through both papers.
5. Turn the voltage up to 6 Volts. Do not go above 6 Volts.

MAPPING THE ELECTRIC FIELD

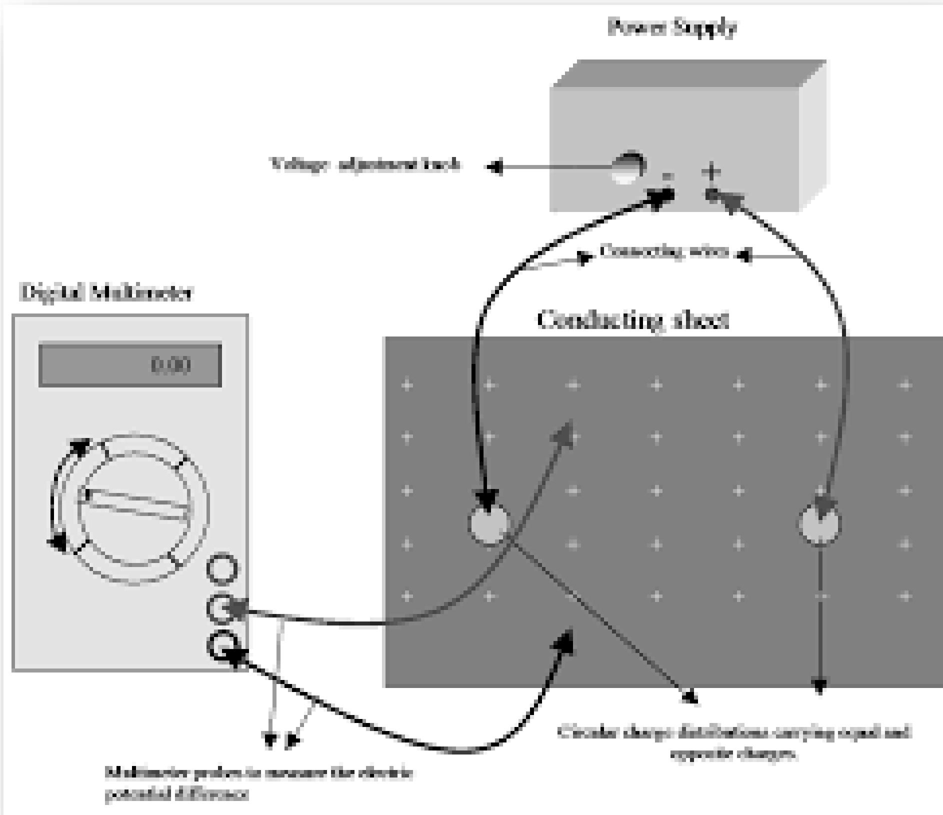
6. Connect the ground terminal of the multi-meter to the negative terminal of the power source.
7. Now, place the other probe from the multi-meter on the conducting paper near one of the pins.
8. Read the voltage on the multi-meter, and poke a hole through the conducting paper.

9. Move the probe around the conducting paper until you get the same reading as above, and then put another hole in the conducting paper. Across the paper. When you have finished a line, record the voltage reading for that line on the paper.

10. Find a total of 7 equipotential lines going across the page.

11. Draw the equipotential lines on the paper, and use those to draw the electric field lines.

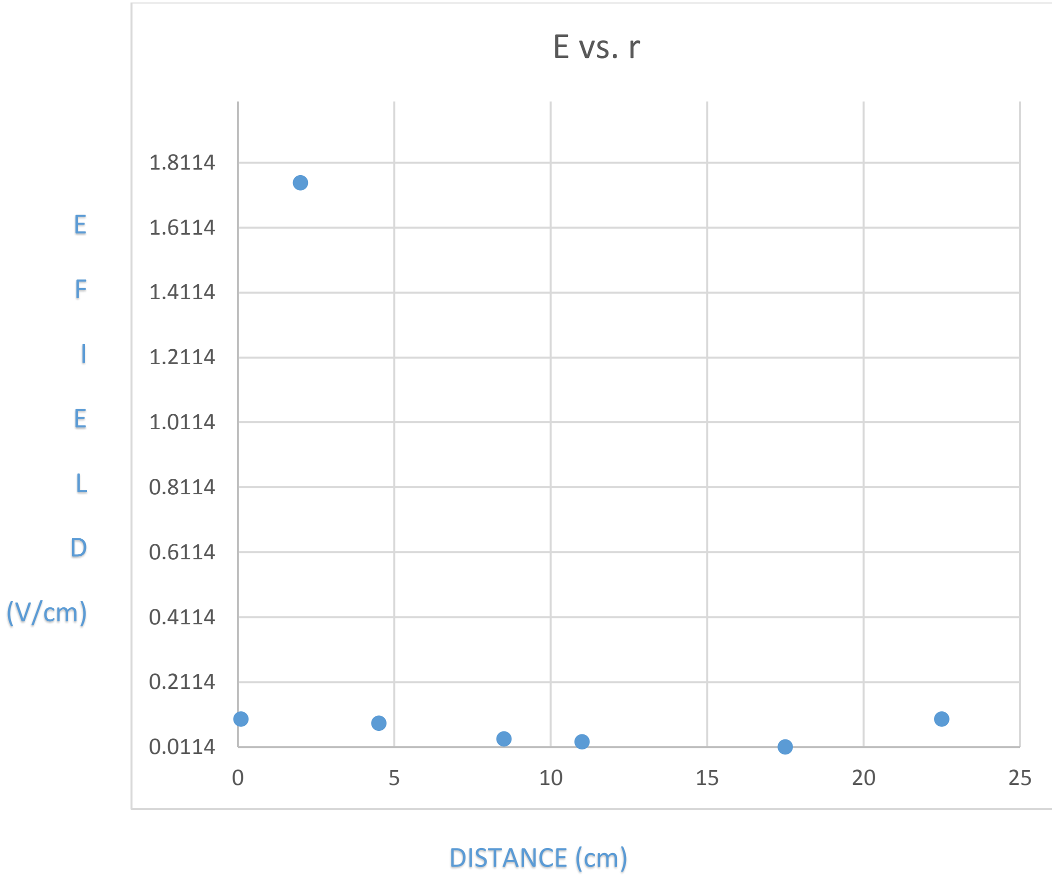
12. Find the average electric field between each adjacent set of equipotential lines.

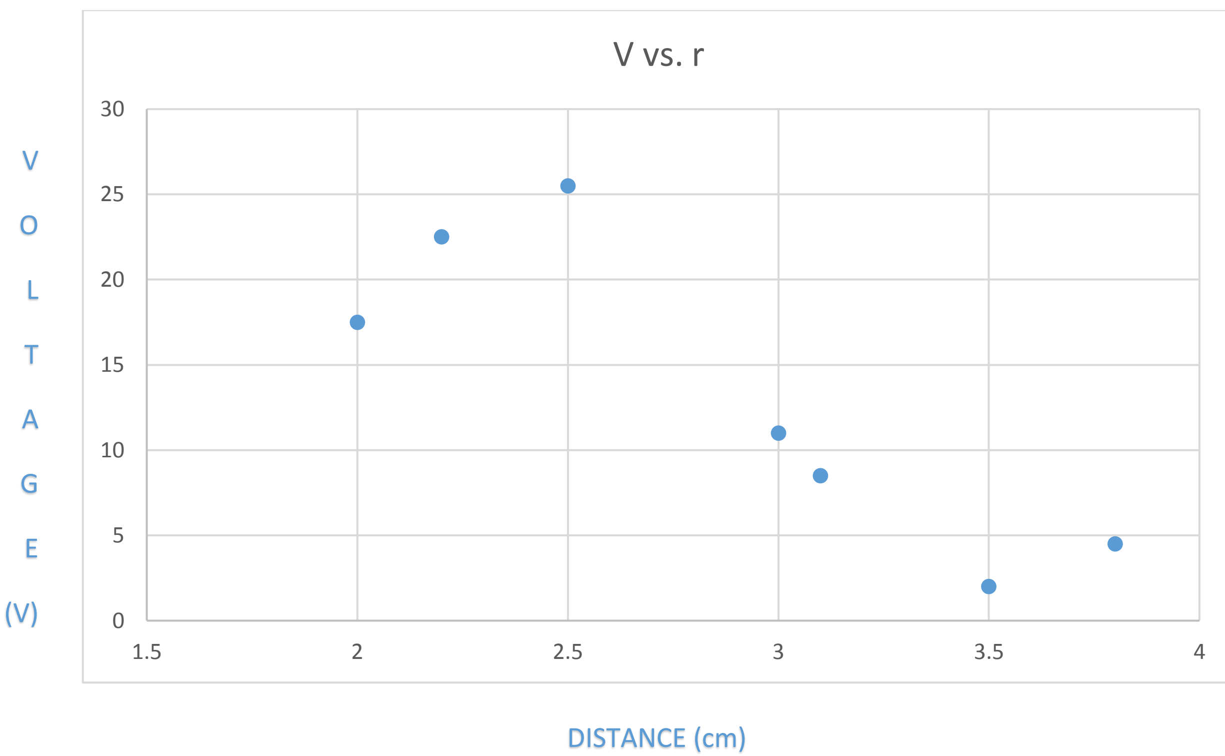


IV. Data/Results/Graphs

Trail 1	Trail 2	Trail 3	Trail 4	Trail 5	Trail 6	Trail 7
3.50 V	3.80 V	3.10 V	3.00 V	2.00 V	2.20 V	2.50 V
3.60 V	3.81 V	3.07 V	2.97 V	2.05 V	2.26 V	2.52 V
3.80 V	3.88 V	3.19 V	2.99 V	2.10 V	2.13 V	2.50 V
3.60 V	3.75 V	3.11 V	3.06 V	2.06 V	2.25 V	2.48 V
3.67 V	3.70 V	3.13 V	3.04 V	2.14 V	2.27 V	2.5 V

Base Voltage (V)	Distance (r) cm	Electric Field (E) v/cm
3.5	2	1.75
3.8	4.5	.0844
3.1	8.5	.0365
3.0	11	.0273
2.0	17.5	.0114
2.2	22.5	.0977
2.5	25.5	.0981


E vs. r
E
F
I
E
L
D
(V/cm)
1.8114
1.6114
1.4114
1.2114
1.0114
0.8114
0.6114
0.4114
0.2114
0.0114
0
5
10
15
20
25
DISTANCE (cm)


V vs. r
V
O
L
T
A
G
E
(V)
30
25
20
15
10
5
0
1.5
2
2.5
3
3.5
4
DISTANCE (cm)

V. Conclusion

In this experiment we were to investigate how equipotential lines and electric field lines are related due to positive in negative charges. The electrical field was at its strongest when it was in the positive of the two pins around coordinates 19 to 23 in reference to the horizontal axis. From the graphs we notice that the further away from the positive charge the weaker the voltage, and the closer to the positive charge the stronger the voltage. So as shown by the graphs and our data we notice that the distance r has a lot to do with the voltage at any particular point in the electric field. Some source of error that we noticed when performing the experiment was that the pins would no stay put as they moved we got different voltages. Also if the conductive paper was touched the voltage would change.