

## Electric Field Computer Lab

1. Open “EM Field” on your computer and explore for 5 minutes. Get to know the program and how to use it.

### Part A: For each of the following situations:

Situation #	Situation Description
1	1 positive charge on the screen
2	1 negative charge on the screen
3	1 positive and 1 negative charge of the same magnitude on the screen
4	2 negative charges of different magnitude
5	2 positive charges of different magnitude
6	1 positive and 1 negative charge (at least 3 levels of magnitude different)

Create a field picture on your computer work space that includes the following choices on the “Field and Potential” menu. When you are done with each situation you should have pictures that include a minimum of the following:

- 25 Field Lines (Try to utilize all the space around a certain charge)
  - 10 different lengths of Field Vectors. At least five of these need to be on the same Field Line
  - 10 different Equipotential lines.
  - 10 Potentials. (At least 5 of these should be on the same Equipotential line.)
2. Once each picture is complete raise your hand and get stamps on your lab sheet from your teacher.
  3. You will get a stamp for completing each of the 4 concepts that need to be included on every picture.
  4. You can achieve a new blank workspace by selecting “3D Point Charges” again.
  5. DO NOT ERASE your final picture!!!

### Part B: Electrostatic Landscapes

1. After you have received stamps for situation # 6, **DO NOT ERASE** it from your work station. Instead go to “Display” and select “Clean Up Screen” and then select “Show Grid.”
2. Go to the “Field and Potential” menu and select “Potential.”
3. Take your cursor to the top-left point and click on it.
4. Then take your cursor to **every other** point (vertical and horizontal) on the grid and click on those points.
5. When you are done you should have 5 rows and 10 columns of numbers in the same pattern as the example demonstrated at the front of class.
6. If you make a mistake, do not start over. Simply exclude unnecessary data when you do step #7.
7. Record each piece of data in Data Table 21-2 in the exact pattern you see on the screen.
8. Add 10 or so Field Lines and Equipotential Lines to your picture.
9. Minimize your EM Field screen to get to the desktop. (DO NOT EXIT OUT!)
10. Open up an Excel spreadsheet.
11. Enter all the values on your grid into an Excel spread sheet exactly as they lie on the grid.
12. Select and highlight all of your data.
13. Create a chart by selecting “Surface Chart” and continue until chart is finished. There will be no title, label or axis labeling on this graph.
14. Rotate the graph until you get the view you desire. Save the excel file to a flash drive, email yourself, or put it in your dropbox.
15. By going back and forth between screens, compare your 3D Excel Graph to the picture you created in EM Field for Situation 6. Make a list of 6 things you notice as proof of your comparison. Write your responses on your lab sheet.
16. At Home also go to the internet and find a Topographical Map of a local area about 1 square mile in area. Print this out at home and bring to class next period. You must print out your own map to get credit.
17. Also when you get home print your excel document and bring next class!