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Asynchronous Activity 1, Worksheet

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1 How to Submit this Worksheet

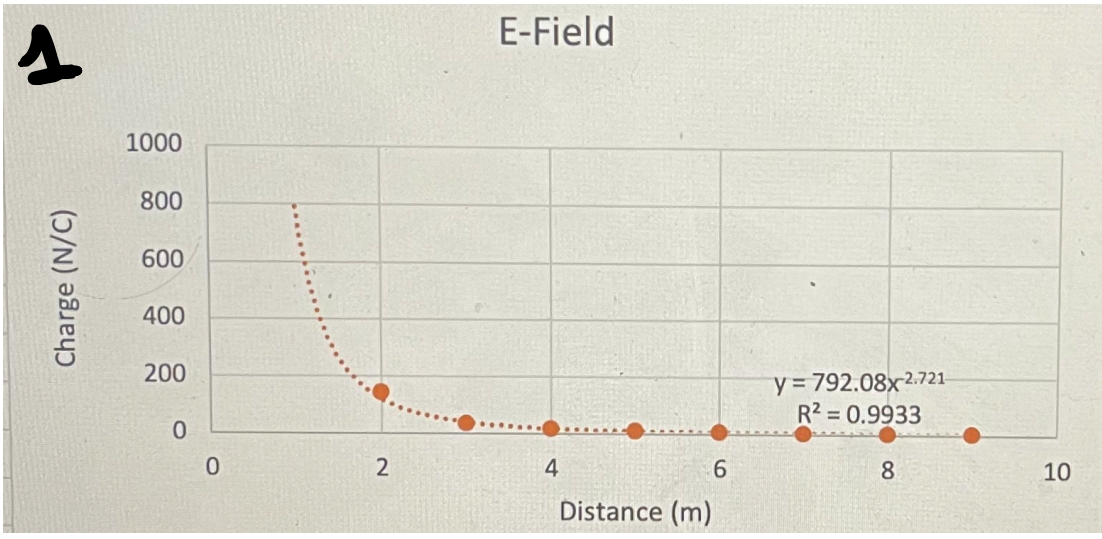
1. Download this PDF to your device.
2. Complete the procedure below.
3. Scan your document into a PDF using a Smartphone app, or simply a photo. One example app is SimpleScanner. Websites also exist to convert jpg to PDF format (e.g. `https://smallpdf.com/jpg-to-pdf`).
4. Upload your worksheet PDF to Moodle via the submission link.

2 The Procedure

Repeat the procedure performed in the tutorial videos on Moodle: *Asynchronous Lesson 1, parts 1 and 2.* However, choose your own distances in the $\vec{E}$ vs. r calculation, and your own charge values in the $\vec{E}$ vs. q calculation. Graph your results below, and label the axes of the graphs with the correct units.

→ For part one, I used 0.25cm as my "r" value.

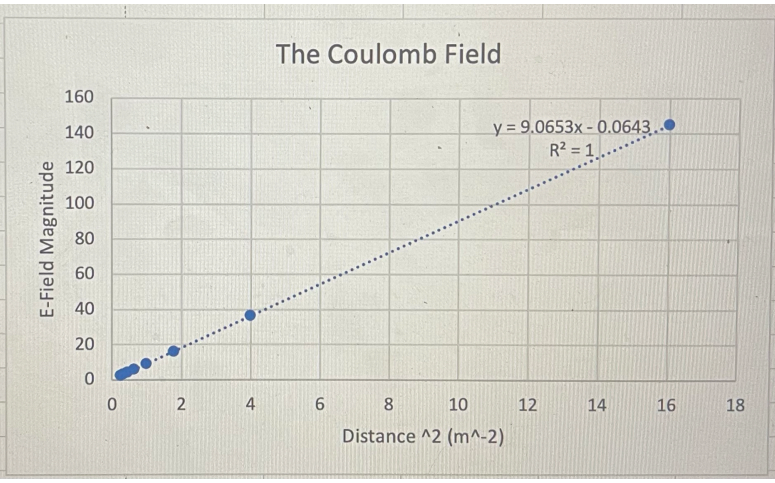
1



Distnace (m)	E-Field (N/C)
0.25	145
0.5	36.2
0.75	15.8
1	9.04
1.25	5.79
1.5	4.02
1.75	2.93
2	2.25

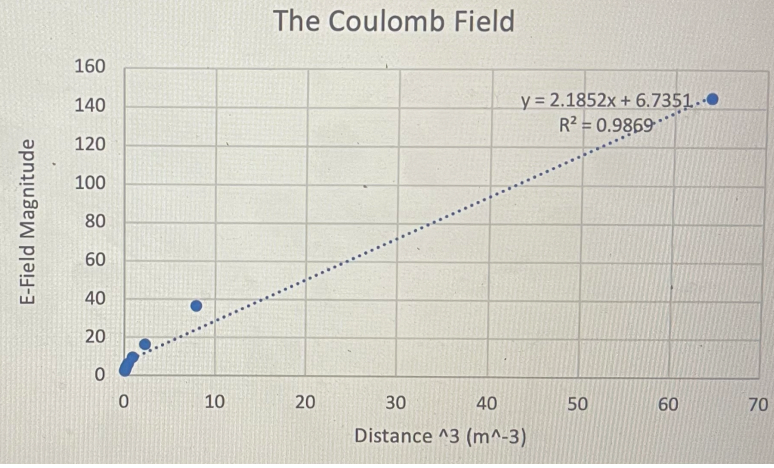
2

1/Distance^2	E-Field (N/C)
16	145
4	36.2
1.7777778	15.8
1	9.04
0.64	5.79
0.4444444	4.02
0.3265306	2.93
0.25	2.25



3

1/Distance^2	E-Field (N/C)
64	145
8	36.2
2.3703704	15.8
1	9.04
0.512	5.79
0.2962963	4.02
0.1865889	2.93
0.125	2.25



*Since graph 1 reported $y = 792.08x^{-2.721}$ I ran a graph using distance^3. However, the distance^2 graph reported a better linear trend. I included graph 3 as an extra.

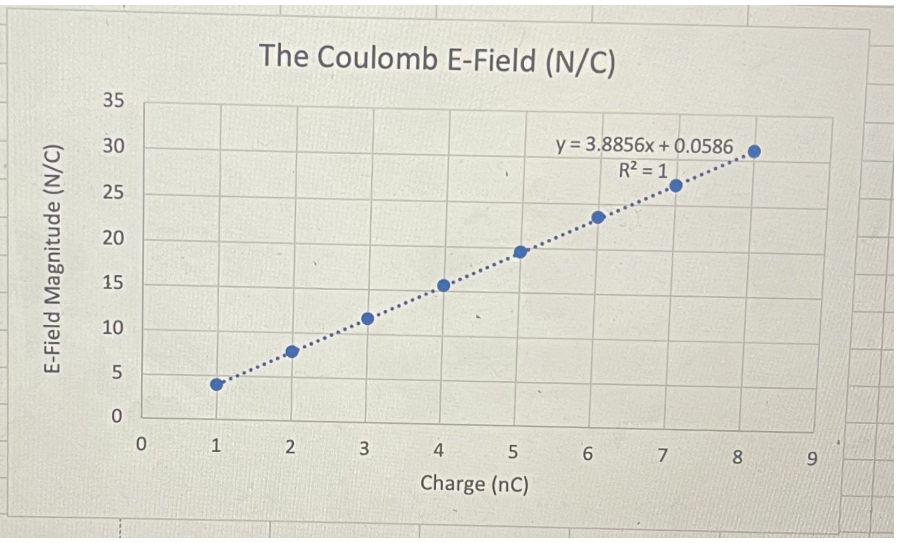
$\vec{E} \propto \frac{1}{r^2}$

* Double r cause E-field value to drop by factor of 4.

→ For part 2 step 4, I placed q_2 at a distance of 1.5m and the video used 2m distance.

4

Charge (nC)	E-Field (N/C)
1	3.93
2	7.82
3	11.7
4	15.6
5	19.5
6	23.5
7	27.2
8	31.1



$E \propto q_1$

* E-field depends linearly on field charge.

$$\vec{F_L} = \frac{K q_1 q_2 \hat{r}}{r^2}$$

Obeys Newton's 3rd Law!

→Part 2 graph 5 used a distance of 1.5m from q_1 and varied charge by factor of 2.

5

Charge (nC)	E-Field (N/C)
2	7.95
4	15.9
6	23.7
8	31.9
10	39.9
12	47.8
14	55.8
16	63.9