**Electrostatics Lab Block 4/4**

**Purpose:** Understand how Coulomb’s Law and Electric fields works conceptually, mathematically, and graphically.

**Part A: The Leyden Jar, the Van De Graaff generator, and Lightning**

Explain how the shock produced by the Leyden Jar and the Van de Graaff generator are similar to how lightning is produced. You can draw diagrams to help your explanation.

**Part B: Coulomb’s Law and Electric Field Strength**

Use the two interactives ([Coulomb’s Law](http://www.physicsclassroom.com/Physics-Interactives/Static-Electricity/Coulomb-s-Law/Coulomb-s-Law-Interactive) for Electric Force and [Charges and Fields](https://phet.colorado.edu/sims/html/charges-and-fields/latest/charges-and-fields_en.html) for Electric Field) to write a CER answering each question below. Be systematic and use purposeful changes such as doubling, tripling, and quadrupling of charge/distance. Make a scatterplot of your data for each section, sketching the graph that you make as part of your CER. Label your axes.

1. How does the electric force vary with distance?

**Claim**

**Evidence**

Table: Graph:

|  |  |
| --- | --- |
| **Distance (d)** | **Electric Force (Fe)** |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

**Reasoning**

1. How does electric field strength vary with the charge of the source (point charge)?

**Claim**

**Evidence**

Table: Graph:

|  |  |
| --- | --- |
| **Charge of source (q)** | **Electric Field (E)** |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

**Reasoning**

1. How does electric field strength vary with distance?

**Claim**

**Evidence**

Table: Graph:

|  |  |
| --- | --- |
| **Distance (d)** | **Electric Field (E)** |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

**Reasoning**

**Part C:** [**Electric Field Hockey**](http://www.physicsclassroom.com/Physics-Interactives/Static-Electricity/Put-the-Charge-in-the-Goal/Put-the-Charge-in-the-Goal-Interactive)

Choose level 1. Draw the electric field lines for a) one goal-scoring positive point charge, b) one goal-scoring negative point charge, and c) a combination of a positive point charge and a negative point charge to score a goal.

1. b) c)

Try some other levels. Draw any successful positions of charges. +1 extra point on this assignment for each successful goal on higher levels.

What did you learn from this activity?

**Part D:** [**Name that Charge**](http://www.physicsclassroom.com/Physics-Interactives/Static-Electricity/Name-That-Charge/Name-That-Charge-Interactive)

Draw a charge diagram labeling the movement of charge for at least one of the questions. I recommend drawing the charges on a question you get wrong at first!

What did you learn from this activity?