Review of Electric Fields

1. Use the *Electric Field Hockey Simulation* in the **Practice** mode to test the variables that affect electrostatic force. In the table below record your observations about what affects the **direction and speed** of the puck. Your table should demonstrate that you have run controlled tests with all the variables.

|  |  |  |
| --- | --- | --- |
| **Variable Tested/****How did you test it?** | **Effect** | **Explanation** |
|  |  |  |
|  |  |  |
|  |  |  |

1. As you put charges onto the playing area, arrows appear on the puck.
2. What do the arrows on the puck illustrate? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Click on the Field box to turn on the Electric Field (if you haven’t all ready done so). How do the Electric Field arrows from the positive charges compare and contrast to the ones from the negative ones?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. If not stated, how could you determine the charge of the puck? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Hit the ***Clear*** button. Check the box marked ***Field***. Set up the following three situations and sketch the fields surrounding each.

d.

c.

b.

a.

1. How does the field near the charge compare to farther away from the charge?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. What sort of interaction will occur between the charges in part c? Describe the field between them.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. What sort of interaction will occur between the charges in part d? Describe the field between them.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Continue with the 3 difficulties to win the prized and highly coveted **Coulomb Cup** (completion up to and including Level 3). ***Please email me a screen shot of you completing each of the 3 difficulties before next class!***
2. Open the *Charges and Field Simulation.* In this simulation, a little different model is used: the little yellow “E-field sensors” are like the hockey puck but they are on a high friction surface, so they stay in place allowing for measurements. You can collect data by turning on ***Show Numbers*** & ***Tape Measure*.**
	1. Determinethe relationship between **amount of charge** and the **strength of the electric field** around a charged body. Keep the distance constant and vary the amount of charge by adding charges **in the same place.** Collect data and plot a graph of E-Field vs. charge below. ***Make sure to use an e-field sensor!***



|  |  |
| --- | --- |
| **E-Field** (V/m) | **Charge** (C) |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

State the relationship between electric field strength and charge.

1. Determinethe relationship between **distance** and the **strength of the electric field** around a charged body. Keep the charge constant and measure the strength of the electric field at different distances (using the orange E-Field sensors). Collect data and plot a graph of E-Field vs. distance below. ***Make sure to use an e-field sensor!***



|  |  |
| --- | --- |
| **E-Field** (V/m) | Distance (m) |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

State the relationship between electric field strength and distance.