Name:_____

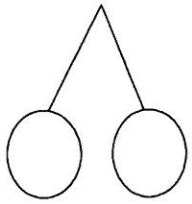
Learning Goals: Students will be able to

- Determine the variables that affect how charged bodies interact
- Predict how charged bodies will interact
- Describe the strength and direction of the electric field around a charged body.
- Use free-body diagrams and vector addition to help explain the interactions.

Go to: 1) **phet.colorado.edu** 2) type in the search bar **electric field hockey simulation** 3) run the simulation to answer the following questions.

Prelab question:

1. You rub balloons in your hair and then hang them like in the picture below. Explain why you think they move apart and what might effect how far apart they get.



2. Test your ideas using *Electric Field Hockey* in the **Practice** mode. A table is below to 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.

Type of charge	Number of charges	Mass	Score?

3. Reflect on your ideas from question #1 and your data from question #2. How do your observations support, dispute or add to your ideas about what affects how charged bodies interact? How might inertia affect electrostatics?

4. As you put charges onto the playing area, arrows appear on the puck.
   - What do you think the arrows on the puck are illustrating?

   - How do the arrows from the positive charges compare and contrast to the ones from the negative balls?

- Do you think the puck is positively or negatively charged? Explain in terms of interaction with like/ unlike charges.

- Investigate how you can use the arrows to predict the motion of the puck.

5. Open ***Charges and Field***. 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. Collect data by turning on **Show Numbers & Tape Measure.**

- Investigate to see if your answers to #4 still make sense using this model. Write how the results of your investigation support or change your ideas.

- Determine the relationship between **distance** and the **strength** of the electric field around a charged body. Collect data in the table below and conclude results.

Distance (m)	Strength of Electric Field Around Charged Body (V/m)

- Determine the relationship between **amount** of charge and the **strength** of the electric field around a charged body. Collect data in the table below and conclude results.

Amount of Charge (C)	Strength of Electric Field around Charged Body (V/m)

6. Write an explanation of how you can predict the motion of a charged hockey puck that is moved by other charged pucks. Explain using examples and drawings that include:

- How to use **free body diagrams** and **vector addition** (→ + ↑ =↗)
- How negative and positive charges compare and contrast.