Electric Field Hockey

Pre-Lab

Draw the electric field around the following charges.



If a positive test charge is placed in the center of the two charges describe which way it will move.



Procedure

- 1. Go to http://phet.colorado.edu/en/simulation/charges-and-fields or google "PHET charges and fields"
- 2. Check "show electric field"
- 3. Place a positive charge. View the picture. Drag and move the charge around. Why are the arrows darker red near the charge and lighter, almost transparent, far away from the charge?
- 4. Click "clear all"
- 5. Place a negative charge. View the picture. Drag and move the charge around. Why are the arrows darker blue near the charge and lighter, almost transparent, far away from the charge?
 - a. Add a positive charge. Sketch the field lines on the diagram.
 - b. Place an orange "E Field Sensor" on the chart. Drag the orange dot around to different locations especially near the two charges.
 - c. The arrow from the orange field sensor gets larger when you bring it near a charge. What does the arrow represent?
- 6. Click "clear all"
- 7. Add two positive charges. Add an orange field sensor. Sketch the field and notice the direction of orange field sensor.
- 8. Click "clear all"
- 9. Add two negative charges. Add an orange field sensor. Sketch the field and notice the direction of orange field sensor.
- 10. Place many positives together with one negative as in the diagram. Now add an orange field sensor. Describe the direction the arrow points. Add some examples to the diagram.



11. Try other configurations.

Physics

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Now play "Electric Field Hockey" <u>http://phet.colorado.edu/en/simulation/electric-hockey</u> or google "PHET electric hockey"

- 1. The goal of this game is to get the black positive puck to go in the goal. Add positive and negative charges to move the positive puck into the net. WARNING: Using too many charges with make it more difficult to score.
- 2. Clear each time you try a new set up. Reset if you want to retry your current set up.
- 3. How can you set up just one negative charge to score a goal? (Remember to hit start)
- 4. How can you set up just one positive charge to score a goal?
- 5. Change the mass and see what happens.
 - a. What happens when the mass is lighter?
 - b. Mass is not a part of the electric force equation, why does mass affect the motion?
- 6. Reset Put one positive charge on the surface and one negative charge directly below it.
- 7. Check the "Field" box.
- 8. Set up a triangle of charges, with two positives and one negative. Draw the field lines for this set up.

- 9. Set difficulty to 1, then 2, then 3. When you beat each level, draw your set up, and show me. Hint: leaving the field box checked might help you
- 10. Level 1 set up:

11. Level 2 set up:

12. Level 3 set up: