

CONCEPTUAL PHYSICS**Tech Lab****Chapter 22: Electrostatics****Field Manipulation Challenge Simulation**

Electric Field Hockey

Purpose

To use a series of simulated game-like challenges to gain a sense of the vector nature of the electric field and the consequence of the inverse square law that governs electrostatic force

Apparatus

computer

PhET simulation: "Electric Field Hockey" (available at <http://phet.colorado.edu>)

Discussion

In the space around a charged object is an ~~area~~ generally described as an electric field. The electric field is a vector quantity, so the fields surrounding multiple charges add vectorially. If they have the same direction, the fields add (Figure 1.a), and if they have opposite directions, they subtract and may even cancel each other (Figure 1.b). And if the directions are at angles to each other, their effects combine and act at a new angle (Figure 1.c).



Figure 1.a. Same direction—fields add



Figure 1.b. Opposite direction—fields cancel



Figure 1.c. Different directions—fields add to a different direction

Software

In "Electric Field Hockey," a player guides a charged puck into the goal (bracket). The player must strategically place positive and negative charges on the "rink" so that when the puck is released, it will be propelled by electric forces into the goal. Clicking the on-screen "Start" button sets the puck free. The charges placed on the rink are fixed in place and will not move.

Procedure

Step 1: Turn on the computer and allow it to complete its start-up cycle.

Step 2: Locate and start the PhET "Electric Field Hockey" simulation. Ask your instructor for assistance if you have difficulty.

Step 3: From the selections available near the bottom of the simulation window,

- leave "Puck is positive" selected.
- activate the "Trace." Leave the other checkboxes unchecked.
- set the mass slider control to 100. (Doing so makes it easier to follow the action on the screen.)
- leave the simulation in "Practice" mode for now.
- Complete the practice exercises that follow.

Continue until your lab time runs out or you win the prized and highly coveted Coulomb Cup (completion of Level 3).

Optional (if using the activity as a time-limited competition): When you score a prescribed goal, leave the trace on the screen and call the instructor over for a verification/stamp. *After* the group's papers have been stamped, click the on-screen "Clear" button and move to the next exercise.

Conceptual Physics Tech Lab Electric Field Hockey Answers

M Carnoy



Conceptual Physics Tech Lab Electric Field Hockey Answers:

The Software Encyclopedia ,1988 *Popular Mechanics* ,2000-01 Popular Mechanics inspires instructs and influences readers to help them master the modern world Whether it s practical DIY home improvement tips gadgets and digital technology information on the newest cars or the latest breakthroughs in science PM is the ultimate guide to our high tech lifestyle *El-Hi Textbooks in Print* ,1980 **Bulletin of the Atomic Scientists** ,1992-05 Who's who in the Midwest ,2002 Books in Print Supplement ,1982

Reviewing **Conceptual Physics Tech Lab Electric Field Hockey Answers**: Unlocking the Spellbinding Force of Linguistics

In a fast-paced world fueled by information and interconnectivity, the spellbinding force of linguistics has acquired newfound prominence. Its capacity to evoke emotions, stimulate contemplation, and stimulate metamorphosis is actually astonishing. Within the pages of "**Conceptual Physics Tech Lab Electric Field Hockey Answers**," an enthralling opus penned by a highly acclaimed wordsmith, readers embark on an immersive expedition to unravel the intricate significance of language and its indelible imprint on our lives. Throughout this assessment, we shall delve to the book is central motifs, appraise its distinctive narrative style, and gauge its overarching influence on the minds of its readers.

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