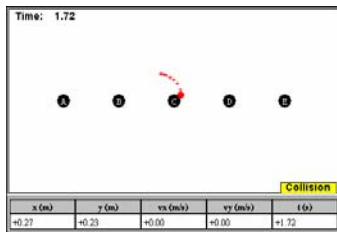


## Worksheet for Exploration 22.3: Electrostatic Ranking Task



Study the motion of a positively charged test object under the action of five fixed charges. Run the animation a number of times starting with the test object in different positions. Before you move the particle, you must push "reset" (otherwise the particle will simply continue along the same trajectory as before). Note that the motion can be quite complicated depending on your choice of initial position (**position is given in meters and time is given in seconds**). Rank the fixed charges from most negative to most positive.

- a. To begin with, start the test charge close to each individual charge separately to determine the signs of the different charges. Which ones are positive, negative, or neutral?
  - i. Indicate the sign of each with a + or -.

A \_\_\_\_\_ B \_\_\_\_\_ C \_\_\_\_\_ D \_\_\_\_\_ E \_\_\_\_\_

You will need to use a systematic approach to rank the negative and positive charges. For the positive charges, you might put the test charge fairly close and then watch the motion (and the trail).

- b. Which positive charge provides a bigger force to the test charge?
  - i. Consider the distances between the trail markers as you allow the test charge to move near each fixed charge.

For the negative charges, put the charge a little ways above the unknown negative charge and watch it approach.

- c. Which one of the negative charges provides a bigger force?

- d. How do you know?

- e. Using this approach, rank the charges.