

POLARITY SHIFT

Name:

Date:

Level 1: Dueling Charges - Professor Mode

In each of the following, draw and label the forces exerted on each of the balls.



When do the balls attract one another?

When do the balls repel one another? Give two examples.

How does the distance between the balls affect the forces exerted on them?

Compare the magnitude and direction of the force exerted on each ball.

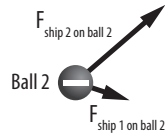
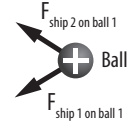
Level 2: Polarity Shift - Professor Mode

In each of the following, draw and label the forces exerted on the ball by each of the electrically charged ships.



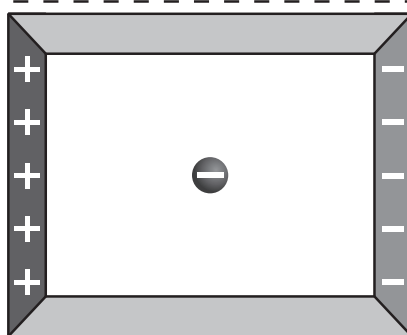
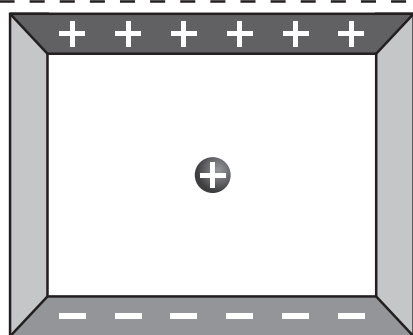
When is the best time to flip your charge so that you can repel the ball toward your opponent? Explain why this is the case.

Show where you could place each ball for it to match the force diagram shown.

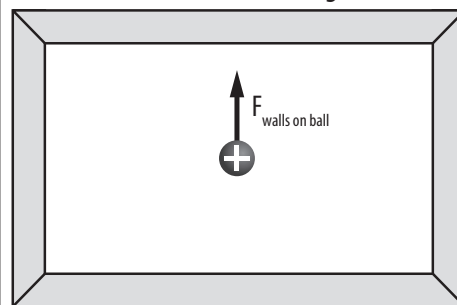


Level 3: Electric Field Chamber - Professor Mode

In each of the following, draw and label the force exerted on the ball.



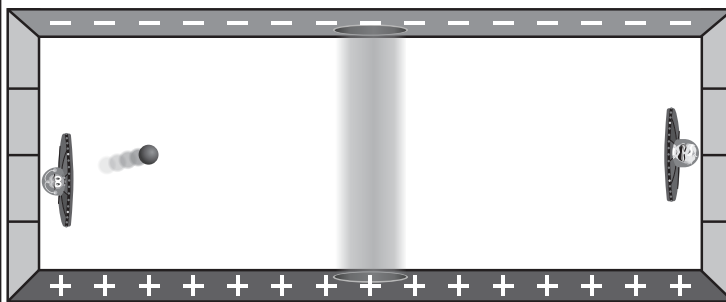
Draw the charge of the walls to match the force diagram.



Give two examples in which the force exerted on the ball is zero.

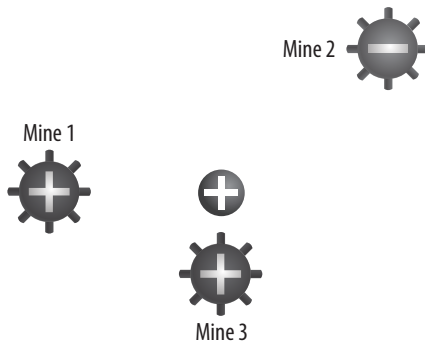
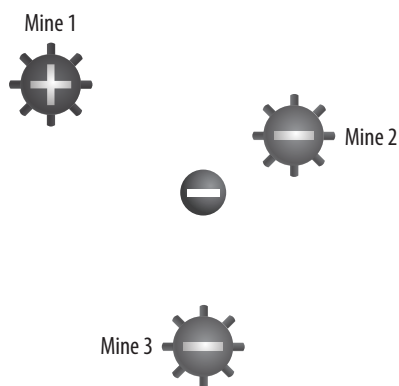
The neutral ball shown below is about to pass through the electron beam and become negatively charged. Draw the complete path of the ball below.

What is the shape of the ball's path when it feels an electric force? What about when it does not feel an electric force?

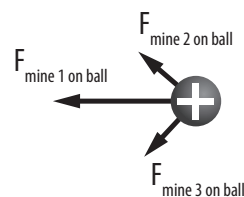


Level 4: Charge Mines - Professor Mode

In each of the following, draw and label the forces exerted on the ball by the mines.



Draw the missing charge mines!



How can you use the charge mines to help defend your wall? Explain your answer.

In each of the following, draw in a third charge mine to put the ball in equilibrium. Then complete the force diagram.

