

Soccer Ball Demonstration

Instructor's Handout

1 Educational Objective

Use a soccer ball to demonstrate the concepts of Newton's First Law.

2 Materials

- Soccer ball (or volleyball, basketball, kickball);
- Large target (notebook, piece of paper, or other large, visible thing on ground);
- Some open space

3 Procedure

Have students take turns running 10 or 15 meters to a target while holding the ball. Tell students to try to **drop** the ball on the target (do NOT throw the ball). While one student is running, the other students should watch and observe the ball. Each student will get a chance to drop the ball. Have students try to run at different speeds, and release the ball at different points. Have students compare the results at different speeds and points of release.

Next, have students take turns kicking the ball and waiting for it to stop. Discuss the forces that are acting on the ball.

4 Discussion

Make sure that students notice that if the ball is dropped directly over the target, it will miss. When the ball drops, its horizontal motion doesn't change—the horizontal force on the ball is zero. The other important point of this activity is that the students recognize that an object traveling on a straight path will continue to travel in straight path unless acted on by an outside force—gravity, in the case of the first activity; and friction, in the case of the second.