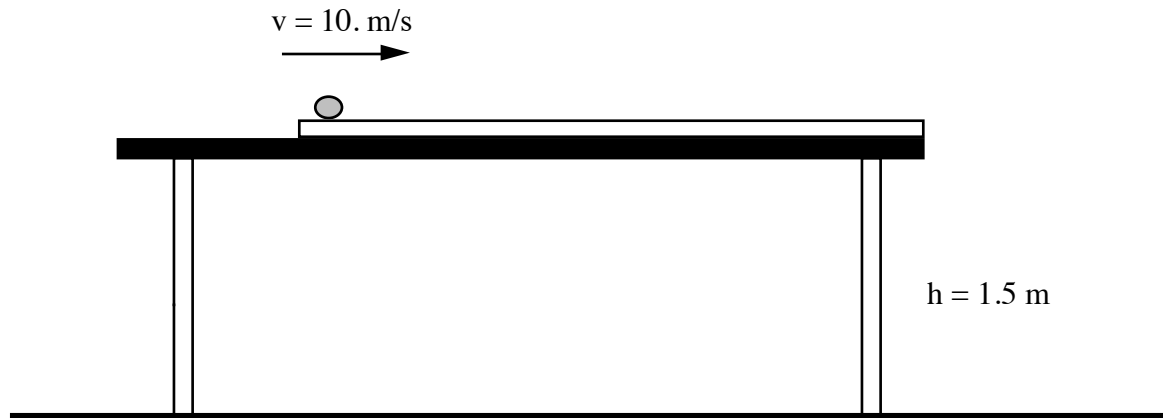


UNIT IV: Worksheet 1

1. A marble rolls along a frictionless rail with a horizontal velocity (v_x) of 10 m/s. The vertical height of the table (Δx_y) is 1.5 m.
- a. Sketch the path of the ball as it rolls off of the table on the diagram below.



- b. Sketch and label force diagrams for the marble both when it is on the rail and off the rail.
- c. How long will the marble be airborne? Show your work.
- d. Determine the horizontal distance the marble will travel as it falls to the floor. Label this distance (Δx_x) on the diagram above.

2. The table in part one is raised to 3.0 m high (so we have doubled the height), and sphere travels with the same horizontal velocity of 10 m/s.
 - a. Do you think the horizontal distance the marble travels as it falls to the floor will be twice as much? Why or why not?
 - b. Sketch and label force diagrams for the marble both when it is on the rail and off the rail.
 - c. How long will the marble be airborne?
 - d. Determine the horizontal distance the marble will travel as it falls to the floor. Show your work.
 - e. What effect did doubling the height have on the horizontal distance the marble traveled? What other factors affect the range of the sphere? How could you double the horizontal distance?