Projectile Motion Virtual Physics Lab

Student Laboratory Report & Kinematics Activity

Student Name	Date	Class / Section
_____	_____	_____

I. Objective

To utilize the digital projectile motion simulator to analyze how launch angle, initial speed, and gravity affect horizontal range, flight time, and maximum height.

II. Apparatus & Setup

Equipment: Internet connected device (PC, laptop, or tablet).

Virtual Lab: https://www.senpaicorner.com/projectile-motion-simulator-lab

III. Activity 1: Launch Angle vs. Horizontal Range

- Open the simulator.
- Set Launch Height = 0 m.
- Set Initial Speed = 30 m/s.
- Set Gravity = 9.8 m/s^2.
- Test each launch angle and record the results.
- Tip: Use the "Compare 5 Angles" feature.

Angle (°)	Speed	Gravity	Theoretical Range	Simulated Range	Flight Time	Maximum Height
15	30 m/s	9.8 m/s^2	45.9 m			
30	30 m/s	9.8 m/s^2	79.5 m			
45	30 m/s	9.8 m/s^2	91.8 m			
60	30 m/s	9.8 m/s^2	79.5 m			
75	30 m/s	9.8 m/s^2	45.9 m			

IV. Activity 2: The Kinematics Target Challenge

- Activate Game Mode.
- Generate a random target.
- Record the target values.
- Calculate the required launch variables and show your working.

Target Distance	_____
Target Height	_____
Local Gravity (g)	_____
Required Launch Variables	_____

Mathematical Calculations:

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V. Analysis & Discussion Questions

1. Which launch angle produced the maximum horizontal range? Explain why.

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2. Compare the range, maximum height, and flight time for 30° and 60°.

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3. Predict what happens to the range on Mars ($g = 3.7\ m/s^2$) using 45° and 30 m/s.

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VI. Conclusion

Briefly summarize how the horizontal and vertical components of initial velocity determine projectile motion.

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