Learning and Simulating Projectile Motion: Part I

TRY TO ENTER THE ANSWER YOU ***EXPECT*** BEFORE ACTUALLY RUNNING THE ***SIMULATION !***

1. (a) Do you EXPECT the horizontal distance (Range) an object flies to depend on its mass?

EXPECTATION: Yes ☐ No ☐

SIMULATION: Yes ☐ No ☐

2. Do you EXPECT a Buick car to fly longer or shorter distance than a golf ball given the same initial speeds and launch angles?

EXPECTATION: Longer ☐ Shorter ☐ Same ☐

SIMULATION: Longer ☐ Shorter ☐ Same ☐

3. Do you EXPECT the vertical distance an object flies (Maximum Height) to be dependent on its mass?

EXPECTATION: Yes ☐ No ☐

SIMULATION: Yes ☐ No ☐

1. Do you EXPECT a Buick car to climb up higher or lower than a golf ball given the same initial speeds and launch angles?

EXPECTATION: Longer ☐ Shorter ☐ Same ☐

SIMULATION: Longer ☐ Shorter ☐ Same ☐

5. Three objects are being shot with the same speeds but with the different launch angles of 65%, 45%, and 30%. Which object do you EXPECT to fly longer horizontal distance (Range)? Rank the results with the numbers 1, 2, and 3. (1 for the winner)

EXPECTATION: 65% ☐ 45% ☐ 30% ☐

SIMULATION: 65% ☐ 45% ☐ 30% ☐

6. Three objects are being shot with the same speeds but with the different launch angles of 65%, 45%, and 30%. Which object do you EXPECT to stay in the air longer? Rank the results with the numbers 1, 2, and 3. (1 for the winner)

EXPECTATION: 65% ☐ 45% ☐ 30% ☐

SIMULATION: 65% ☐ 45% ☐ 30% ☐

7. If the initial speed is doubled, given the same launch angle, how that would affect: **Range:**

EXPECTATION: same ☐ double ☐ triple ☐ quadruple ☐

SIMULATION: same ☐ double ☐ triple ☐ quadruple ☐

Max Height:

EXPECTATION: same ☐ double ☐ triple ☐ quadruple ☐

SIMULATION: same ☐ double ☐ triple ☐ quadruple ☐

Flight Time:

EXPECTATION: same ☐ double ☐ triple ☐ quadruple ☐

SIMULATION: same ☐ double ☐ triple ☐ quadruple ☐

8. Move the target at the horizontal distance 10 m away and the height of 7 m. Use a stretchable and movable ruler shown to achieve that. Try to shoot with a piano to hit a target with the initial speed of 50 m/s. Record the EXPECTED and SIMULATED launch angles.

EXPECTED ANGLE:

SIMULATION: