

Title: Free Fall Lab

Purpose:

- to practice using an online Physics simulation
- to investigate factors that affect the free fall of a bouncing ball
- to investigate the relation between height and number of bounces

Procedure:

Open Physics Exploration

Go to my computer...local disk C...Exploration of Physics Vol. I
Click on the *Exploration of Physics* Icon
Go to *Motion* and then *Free Fall Laboratory*
Explore how the simulation works for about 5 minutes



Experiment 1: How does height affect bouncing balls?

1. Predict how height affects the number of bounces and the time between bounces.
2. Reset the simulation. Adjust the y-axis to 100 m and the x-axis to 50 s
3. Use default settings except for height
4. Set gravity as indicated in Data Table 1
5. Record your results in Data Table 1
6. Graph your results
7. Determine the type of relation among height, number of bounces, and time between bounces (direct, indirect, exponential, periodic, random)

Experiment 2: How does gravity affect bouncing balls?

1. Predict how gravity affects the number of bounces and time to stop bouncing.
2. Reset the simulation.
3. Use default settings except for gravity
4. Set gravity as indicated in Data Table 1
5. Record your results in Data Table 2
6. Graph your results
7. Determine the type of relation among gravity, number of bounces, and time (direct, indirect, exponential, periodic, random).

Experiment 3: How does air density affect bouncing balls?

1. Predict how air density affects the number of bounces and the time to stop bouncing.
2. Reset the simulation
3. Use default settings except for air density
4. Set air density as indicated in Data Table 3
5. Record your results in Data Table 3
6. Graph your results
7. Determine the type of relation among air density, number of bounces, and time (direct, indirect, exponential, periodic, random).

Experiment 4: How do mass, radius, or wind speed affect bouncing balls?

1. Predict how height affects the number of bounces and the time to stop bouncing.
2. Reset the simulation
3. Use default settings except for the variable you select to study.
4. Indicate in Data Table 4 your variable settings
5. Record your results in Data Table 4
6. Graph your results
7. Determine the type of relation among mass, radius, or wind speed and number of bounces, and time (direct, indirect, exponential, periodic, random).

Discussion:

- Follow lab write-up [guidelines](#). Remember to support states with data from your experiments!

Conclusion:

- You should have 4 conclusions from this lab!

Reflection:



