***How High is that 2nd Floor Railing, Anyway?***

**No more than 3 students per group.**

**Be sure to show all of your work, and answer all questions!**

**Objective:**

To determine the height, in meters, of the 2nd floor railing by using freefall equations

**Materials:**

2 different objects to be dropped, stop watch

**Procedure:**

You will be dropping two objects three times each, and timing how long it takes them to hit the ground from the height of the second story railing. Then by using your equations, you will determine the height of the railing and compare it to the accepted value (AV) , which is provided by the teacher.

The accepted value (AV) for the railing height is: AV = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

*\*\*\*Make sure you write the correct units after your value*.

1. List the 2 objects assigned to your group in data table #1.

2. Record the time it takes for each of the objects to strike the ground. Time each object 3 times, and find the average time.

3. Use the equation from your notes to calculate the height (d) for each of your two objects.

***Show all of your work in the area under the data table, and include units in your final answers.***

4. To calculate your error, use the accepted value (AV).

% error = |your calculated height – AV| x 100%

AV

5. List any sources of error that may have affected your results

6. Using the equation from your notes, determine the final velocity of both objects as they strike the ground.

Use your average time for t, fill in the values in Table #2, and be sure to show all work

**Prelab Questions and Equations:**

1. Define “freefall”

2. What causes the acceleration acting on an object in freefall?

b. What is the numerical value?

c. In what direction does it act?

3. Write the following equations from your notes:

a. To find how far an object falls during freefall: d =

b. To find the final velocity of an object in freefall: vf =

**Data Table 1**

**d = 5t2**

**Object time 1 time 2 time 3 average time calculated height % error**

**1.**

**2.**

Show your work!

Sources of error:

**Data Table 2**

**(from table 1) v = gt**

**Object average time Final velocity**

**1.**

**2.**

Show your work!

Why should vf actually be a negative number?