Acceleration Due to Gravity Lab

Names: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_ Hour: \_\_\_\_\_\_\_

**Pre-Lab Questions:**

Answer the following questions in COMPLETE, THOUGHTGUL SENTENCES.

1. What causes dropped objects to fall towards Earth?

2. Do dropped objects maintain a constant velocity when falling? Explain.

3. Assuming there is no air resistance to slow them down, do all objects accelerate at the same rate regardless

 of their mass?

**Objective**: In this lab you will measure “g”, the acceleration due to gravity on Earth. You will also get practice

 measuring, collecting, and interpreting data.

**Materials**: tennis ball, meter stick, time measuring device (stopwatch or CMV EDU app)

**Procedures**:

1. Find a location suitable for dropping your object and mark (with tape) a height of 1.5 meters. This should

 be measured and marked as accurately as possible.

2. Drop the ball 5 times while recording the time. I strongly suggest using the CMV EDU app for increased

 accuracy. Record time in data table.

3. Calculate the average time it took the ball to fall.

4. Calculate the Earth’s acceleration due to gravity (see calculation section).

**Data:**

|  |  |  |
| --- | --- | --- |
| Trial # | Height (m) | Time (s) |
| 1 | 1.5 |  |
| 2 | 1.5 |  |
| 3 | 1.5 |  |
| 4 | 1.5 |  |
| 5 | 1.5 |  |
| Average | 1.5 |  |

**Calculations/Questions:**

**Include units for all answers of calculations.**

1. What is the formula for acceleration?

2. Before the object was dropped what was its initial velocity (vi)?

3. Using the data in your data table, determine the average velocity by dividing the average height by the

 average time (speed = distance /time). Show your work.

4. What you calculated in #3 was AVERAGE velocity. In order to determine FINAL velocity, you have to

 multiply the average velocity by 2. Do this now. Show your work. Your answer is your vf.

5. You now have vi, vf and t (use your average time). Plug these into the equation in #1 and solve for

 acceleration. Show your work.

6. The actual value of the acceleration due to gravity is 9.8 m/s2. Calculate your percent error by using the

 equation below.

 % error = Your value for acceleration – 9.8 m/s2 x 100% =

 9.8 m/s2

7. Describe what your sources of error may have been.