**Unit 3 Factors Affecting Acceleration Due to Gravity**

**Data Collection**

|  |
| --- |
| [**https://www.thephysicsaviary.com/Physics/Programs/Labs/PVCFreefallLab/index.html**](https://www.thephysicsaviary.com/Physics/Programs/Labs/PVCFreefallLab/index.html) |

|  |
| --- |
| **Part A: Effect of Object Mass (Material Type) on Acceleration Due to Gravity****(adjust “Cylinder Composition”)** |
| **Table 1 – Effect of Object Mass (Material Type) on Acceleration Due to Gravity****Constant *\_Conducted on (Planet)\_\_* = \_\_\_\_\_\_\_\_\_\_\_\_; Constant \_*Nail Placement (Height)*\_\_ = \_\_\_\_\_\_** **Constant *Cylinder length* = 5.0 cm = 0.050 m; Constant *Displacement (Nails x 0.05 m) = \_\_\_\_\_*****Constant *Initial Velocity* = 0.0 m/s;**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Trial** | **Rep.** | **Cylinder Composition** | **Object Mass** ***m*****(g)** | **Gate 1 Blocked** ***t1*** **(s)** | **Gate 1 Unblocked** ***t2*** **(s)** | **Time Interval*****Δt*****(s)** | **Final Average Velocity vf** **(m/s)** | **Accel. Due to Gravity *g*****(m/s2)** |
| **1** | **1** | **copper** | **140** |  |  |  |  |  |
| **2** | **1** | **aluminum** | **43** |  |  |  |  |  |
| **3** | **1** | **plastic** | **17** |  |  |  |  |  |
| **4** | **1** | **gold** | **303** |  |  |  |  |  |
| **5** | **1** | **wood** | **12** |  |  |  |  |  |

 |

|  |
| --- |
| **Part B: Effect of Height on Acceleration Due to Gravity****(adjust “Nail Placement” from 4-9)** |
| **Table 2 – Effect of Height on Acceleration Due to Gravity****Constant *\_Conducted on (Planet)\_\_* = \_\_\_\_\_\_\_\_\_\_\_\_; Constant \_(*Cylinder Composition)*\_\_ = \_\_\_\_\_\_\_\_** **Constant *Cylinder length* = 5.0 cm = 0.050 m; Variable *Displacement=Height (Nails x 0.05 m)*****Constant *Initial Velocity* = 0.0 m/s;**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Trial** | **Rep.** | **Nail Placement**  | **Height*****m*****(g)** | **Gate 1 Blocked** ***t1*** **(s)** | **Gate 1 Unblocked** ***t2*** **(s)** | **Time Interval*****Δt*****(s)** | **Final Average Velocity vf** **(m/s)** | **Accel. Due to Gravity *g*****(m/s2)** |
| **1** | **1** |  |  |  |  |  |  |  |
| **2** | **1** |  |  |  |  |  |  |  |
| **3** | **1** |  |  |  |  |  |  |  |
| **4** | **1** |  |  |  |  |  |  |  |
| **5** | **1** |  |  |  |  |  |  |  |
| **6** | **1** |  |  |  |  |  |  |  |

 |

|  |
| --- |
| **Part C: Effect of Planet on Acceleration Due to Gravity****(adjust “Conducted On”)** |
| **Table 3 – Effect of Planet Mass/Radius Squared Ratio (Planet) on Acceleration Due to Gravity****Constant \_(*Cylinder Composition)*\_\_ = \_\_\_\_\_\_\_; Constant \_*Nail Placement (Height)*\_\_ = \_\_\_\_\_\_** **Constant *Cylinder length* = 5.0 cm = 0.050 m; Constant *Displacement=Height (Nails x 0.05 m)=*0.35 m****Constant *Initial Velocity* = 0.0 m/s;**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Trial** | **Rep.** | **Planet** | **Planet Mass/Radius Squared****Ratio****(kg/m2)** | **Gate 1 Blocked** ***t1*** **(s)** | **Gate 1 Unblocked** ***t2*** **(s)** | **Time Interval*****Δt*****(s)** | **Final Average Velocity vf** **(m/s)** | **Accel. Due to Gravity *g*****(m/s2)** |
| **1** | **1** |  |  |  |  |  |  |  |
| **2** | **1** |  |  |  |  |  |  |  |
| **3** | **1** |  |  |  |  |  |  |  |
| **4** | **1** |  |  |  |  |  |  |  |
| **5** | **1** |  |  |  |  |  |  |  |
| **6** | **1** |  |  |  |  |  |  |  |

 |