# Lab 3: Acceleration

Experiment for Physics Introductory Mechanics 211 Lab at CSU Fullerton.

## What You Need To Know:

## What You Need To Do:

### The Equipment

### Part 1 – Constant Velocity

Acceleration:

Acceleration:

v

v

t

t

Figure – Part 1 Sketches

Below each graph write down what the acceleration would be. How do you know this?

### Part 2 – Changing Velocity Away from the Sensor

v

t

v

t

Figure – Part 2 Sketches

|  |  |
| --- | --- |
| Cart Acceleration | |
| 1 |  |
| 2 |  |
| 3 |  |

What do you conclude about the acceleration offered by the fan? Is it changing or roughly constant? Support your answer.

|  |  |  |  |
| --- | --- | --- | --- |
| Part | v | a | Motion of cart |
| **2** |  |  |  |
| **3** |  |  |  |
| **4** |  |  |  |
| **5** |  |  |  |

Table – Data Parts 2-5

### Part 3 – Changing Velocity Towards The Sensor

v

t

v

t

Figure – Part 3 Sketches

### Part 4 – Opposite Velocity and Acceleration

### Part 5 – Opposite Velocity and Acceleration Again

Upon examining your completed motion table, write down an overall statement that you can make about the relationship between velocity of an object, acceleration of an object, and its motion.

### Part 6 – Freefall

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **n** | **tn** | **Δt** | **yn** | **Δy** | **v** |
| **2** |  |  |  |  |  |
| **3** |  |  |  |  |  |
| **4** |  |  |  |  |  |
| **5** |  |  |  |  |  |
| **6** |  |  |  |  |  |

Table – Freefall Data

y

t

Figure – Part 6 Sketch

Based on what you learned in last week’s lab and the graph you just made, what kind of velocity is this graph showing? (i.e. pos./neg. and inc/dec/constant?) Make a sketch of what you think the ***v vs. t*** graph will look like.

% Difference calcuation

### Part 7 – Back And Forth Motion

|  |  |  |  |
| --- | --- | --- | --- |
| Duration | v | a | Motion of cart |
| **Moving towards the sensor** |  |  |  |
| **At the peak** |  |  |  |
| **Moving away from the sensor** |  |  |  |

Table – Part 7 Data

v

v

t

t

Figure – Part 7 Sketches



Does your “a” column have the same value for all three rows? If so, explain why. If not, explain why. (Think about what the fan is doing during the entire motion.) Does your answer agree with your answer from **Checkpoint 16**?

### Part 8 – Throwing a Bag

|  |  |  |  |
| --- | --- | --- | --- |
| Duration | v | a | Motion of cart |
| **Moving towards the sensor** |  |  |  |
| **At the peak** |  |  |  |
| **Moving away from the sensor** |  |  |  |

Table – Part 8 Data



Does your “a” column have the same value for all three rows? If so, explain why. If not, explain why. (Think about what gravity is doing during the entire motion.)

## Conclusion

Follow the lab report guide to write a conclusion on this lab.

Conclusion