# Newton’s Second Law

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**Activity 1: Newton’s Second Law Data Table 1**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Suspended Mass (kg) | Weight of Suspended Mass (mass x 9.8 m/s2), Newtons | Time (sec) | Average Time | Average Time2 | d (m)  0.58 | 2d (m) | Acceleration = 2d/t2 |
| 3 Washers | 19.4g  0.0194kg  **0.19N** | Trial 1: N/A | N/A  (The car did not move) | N/A  (The car did not move) | 0.58m | 1.16m | N/A  (Could not calculate due to no applicable time) |
| Trial 2: N/A |
| Trial 3: N/A |
| 4 Washers | 24.9g  0.0249kg  **0.24N** | Trial 1: 2.19s | 2.39s | 5.71s | 0.58m | 1.16m | 0.20 |
| Trial 2: 2.27s |
| Trial 3: 2.71s |
| 5 Washers | 30.6g  0.0306kg  **0.30N** | Trial 1:  1.50s | 1.74s | 3.03s | 0.58m | 1.16m | 0.38 |
| Trial 2: 1.91s |
| Trial 3: 1.81s |
| 6 Washers | 36.2g  0.0362kg  **0.35N** | Trial 1: 1.47s | 1.40s | 1.96s | 0.58m | 1.16m | 0.59 |
| Trial 2: 1.32s |
| Trial 3: 1.42s |
| 7 Washers | 41.5g  0.0415kg  **0.41N** | Trial 1: 1.18s | 1.22s | 1.49s | 0.58m | 1.16m | 0.78 |
| Trial 2: 1.24s |
| Trial 3: 1.23s |
| Mass of the system | .276kg | | | | Slope of the Line (kg) | 3kg | |

Insert your graph here for force (N) vs. acceleration (m/s2).

Acceleration in

Force in Newton’s

**Activity 1: Questions for Newton’s Second Law**

Question 1:   
According to Newton’s Second Law ***F*** = *m****a***.  
If the force applied to an object is doubled, what happens to the acceleration?

If the force was doubled it would cause the acceleration would double as well. For example, if the original problem as Force equaled 20, mass was 4, and acceleration was 5. And the Force was then doubled, it would now be 40. The problem would then look like 40 =4a. When you solve the equation, the new acceleration would be 10 which doubled the original value.

Question 2:  
You observe a vehicle traveling on a highway. The vehicle is maintaining a constant velocity. What can you determine about the forces on the vehicle?

If the vehicle is continuing at a constant velocity, then we can assume that the force would equal 0. If there was a force then the vehicle would at some deacceleration slow down or at some acceleration speed up.

Question 3:   
What are some error sources in the Second Law experiment?

Some of the error sources could have been two different things. The first one could have been the cart not moving 100% straight to the pully changing the time slightly. The other would-be airflow. If I was to have a window open close enough a slight breeze could change the weight of the system giving me an incorrect answer.

Question 4:  
In the Second Law experiment, the acceleration is calculated by measuring the time for the cart to move from the start point to the endpoint and applying the kinematics equation:

Explain how this equation is used to find the acceleration.

The acceleration would be found by switching up the equation so that it would solve for “a”. Once the equation is switched then the variables must be substituted with the data from the experiment. The equation would look like: a = .