

Physics "the domino effect" lab report essay sample



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Physics “ The Domino Effect” Lab Report Essay Sample

Aim

To investigate the relationship between the mass of the dominoes, and how it impacts the time taken of the domino effect. Independent Variable: The mass of each domino (12. 38 g, 32. 38 g, 42. 38 g, 62. 38 g, 82. 38 g).

Dependent Variable: Time taken of the domino effect.

Controlled Variable: The number of dominoes used (8 dominoes), the distance between the dominoes (2 cm), the loads used as the initial force applied on the domino (50g), the inclined plane used as a platform that will direct the load to hit the first domino (20o), the stopwatch used to time the domino effect, the person using the stopwatch, the person releasing the metal weight from the top of the inclined plane, the ruler used to measure the distance between the dominoes. Equipment

1 Inclined Plane

1 (50 g) Metal Weight

4 x 8 (20 g) Metal Weight

8 Dominoes (Uno Stackos)

1 Digital Mass Balance (± 0.01 g)

1 Masking Tape

1 Protractor

1 Ruler

1 Stopwatch (± 0.01 s)

-34290039687500Diagram

Analysis of Variables

Independent Variable:

The mass of the dominoes will vary ranging from 12.38 g to 82.38 g. The increase between each of the variable will be constantly 20 g, to satisfy the range of the mass; the original mass of the domino is 12.38 g, and an additional mass from a 20 g of load will be attached on top of the domino for every change in variable. Dependent Variable:

In accordance to the mass for every variable, the time taken of the domino effect to be completed (1st hit to the 8th fall) will also differ. Therefore, the time taken of the domino effect will depend on the change of mass of the dominoes. A stopwatch will be utilized to record the time of the chain of falling dominoes. Controlled Variable:

Identified Variables Possible Impact on Results Specific Method for Control

Distance between each center point of domino (2 cm) If the distance between each center point of domino differs for every domino in each trial, the time taken of the falling effect will also differ. Making the distance between each domino the same will create the energy transfer from one domino to another domino to be the same as well. The energy transfer will take a certain time, therefore the distance between each domino must be kept constant so that the time taken will not be altered, thus creating a consistent and valid data. The distance between the dominoes (2 cm) will be measured with a 15 cm ruler. To ensure the exact placement of the domino, a masking tape will be used to mark the center point. Number of dominoes (8) The difference in the number of dominoes used for each trials will definitely affect the time taken to complete the domino effect. The greater the amount of dominoes used, the longer the time taken to complete the

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effect. Similarly, using a smaller amount of domino results in faster falling time.

Thus using inconsistent number of dominoes will likely cause invalid comparison between data points to occur. 8 dominoes will be used for the entire experiment. Mass of the metal weight (500 g) If the mass of the metal weight is different, this will affect the initial force acting upon the domino, and ultimately this will increase or decrease the rate of the falling domino, or it might not even budge the dominos at all. The same metal weight will be utilized for the entire experiment. Angle between the base and the inclined ramp (20°) The angle of the ramp also impacts the placement of the metal weight that acts as the trigger to push the dominoes. If the angle of the ramp is not kept constant, the potential energy stored in the metal weight will be different, thus when it is set into motion, the force that will hit the domino will not be the same. This will then interfere the consistency of the data. The angle of 20° will be set by using a protractor. Type of inclined plane Even though friction is neglected in this experiment, by using a different type of inclined plane, the acceleration of the metal weight will be slightly modified, thus the initial force exerted by the metal weight on the domino will also be altered. The same wooden plane will be utilized for the entire experiment.

Starting point of the metal weight If the starting point of the ball is inconsistent, the force applied on to the dominoes will also be inconsistent, thus altering the overall data. The place where the ball will be released will be marked by a masking tape. Placement of the dominoes In order to ensure that the domino effect will move smoothly without any obstruction, the dominoes must be placed neatly in a straight line. This will avoid interruption

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for the time taken for the domino effect to be completed. A ruler will be used to ensure that the dominoes are placed in a straight line. Digital Mass Balance Different digital measurement tools have different calibration. Therefore, it is a crucial aspect to use the same digital mass balance for every trial because this will help create a trend in the data that is accurate and precise. Employing the same digital mass balance for the entire experiment. Person in charge of the timing the domino effect. Every person has different reaction time; therefore, appointing the same person will create reliable points in the data. Assigning the same person for the entire experiment. Procedure

Set the inclined plane into 20°, with the help of the protractor. Mass of each of the dominoes (domino + loads) (± 0.01 g) Period of domino effect [1st hit of domino to the 8th fall] (± 0.01 s)

Trial 1 Trial 2 Trial 3 Trial 4 Trial 5

12.38 g 3.99 s 3.96 s 3.94 s 3.96 s 3.95 s

32.38 g 2.71 s 2.70 s 2.73 s 2.72 s 2.74 s

42.38 g 1.60 s 1.62 s 1.64 s 1.63 s 1.61 s

62.38 g 1.03 s 1.04 s 1.02 s 1.07 s 1.05 s

82.38 g 0.61 s 0.60 s 0.62 s 0.63 s 0.61 s

Set up the dominoes with 2 cm of gap in between each of the domino, with the help of a ruler. Place the inclined plane right behind the 1st domino.

Place the 50 g load on top of the inclined plane, and let it slide down to hit the domino. Record the time taken of the domino effect with a stopwatch, as soon as the metal weight creates contact with the first domino. For every

different variable, add a metal weight (20 g) on top of the domino by sticking it with a masking tape. Repeat steps 1 - 5 for each of the variable.