Acceleration Investigation

In this experiment you will calculate the acceleration of a toy car and investigate how this changes when the force applied to it changes or the mass of the car changes.

Experiment 1

Measuring the effect of force on acceleration

Apparatus

- toy car/trolley
- metre ruler
- pencil/chalk/tape to mark distance intervals
- bench pulley
- string
- small weights
- stopwatch

Method

1. Use the ruler to measure regular intervals on the bench (e.g. every 20 cm) and mark these intervals using pencil, chalk or tape
2. Attach the bench pulley to the end of the bench
3. Tie a length of string to the toy car and pass the string over the pulley
4. Attach the other end of the string to a small stack of weights
5. Hold the toy car at the starting point
6. Release the toy car and start the stopwatch at the same time
7. Press the stopwatch (lap mode) as the toy car passes each distance interval
8. Record your results in the table below
9. Repeat steps 5-8 changing the number of weights in the stack each time

	Weight of weight stack (N)			
Distance Travelled (cm)	**Time (s)**	**Time (s)**	**Time (s)**	**Time (s)**
20				
40				
60				
80				
100				

Calculations

For each weight calculate:

- initial velocity
- final velocity
- acceleration

Weight of weight stack				
Initial velocity				
Final velocity				
Total time				
Acceleration				

Conclusion

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Experiment 2

Measuring the effect of mass on acceleration

Apparatus

- toy car/trolley
- metre ruler
- pencil/chalk/tape to mark distance intervals
- bench pulley
- string
- small weights
- stopwatch

Method

1. Use the ruler to measure regular intervals on the bench (e.g. every 20 cm) and mark these intervals using pencil, chalk or tape
2. Attach the bench pulley to the end of the bench
3. Tie a length of string to the toy car and pass the string over the pulley
4. Attach the other end of the string to a small stack of weights (choose a weight from the first experiment that allowed you to measure the acceleration easily)
5. Hold the toy car at the starting point
6. Release the toy car and start the stopwatch at the same time
7. Press the stopwatch (lap mode) as the toy car passes each distance interval
8. Record your results in the table below
9. Repeat steps 5-8 adding mass on top of the toy car each time (e.g. adding 200g each time)

	Mass on car (kg)			
Distance Travelled (cm)	**Time (s)**	**Time (s)**	**Time (s)**	**Time (s)**
20				
40				
60				
80				
100				

Calculations

For each different mass on the car calculate:

- initial velocity
- final velocity
- acceleration

Mass on car				
Initial velocity				
Final velocity				
Total time				
Acceleration				

Conclusion

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