

Nat

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National 5 Assignment
F, m and a- constant mass: Guide Sheet B

**Variation of force on the acceleration of an object**

In this experiment, a trolley is accelerated by weights which are hanging on the end of a string which passes over a pulley. It is important to note that the mass which is being accelerated includes the mass on the end of the string. In this experiment the mass of the vehicle remains constant.

accelerating washers

washers

trolley

mask size 1 cm

light gates

(resourcefulphysics.org)

**Apparatus**

A trolley, track, pulley, thread, 10 g masses and a mass hanger, metre stick, light gates and timer.

**Instructions:**

* Set up the apparatus as shown in the diagram.
* Compensate for friction by tilting the track slightly so that the trolley runs steadily down with no increase in speed when there is no force pulling it.
* Set up the interface to measure the acceleration of the trolley.
* The mass to be accelerated is the mass of the trolley and the mass on the end of the pulley the accelerating force is the weight of the suspended masses .
* Allow the trolley to accelerate down the track and record the acceleration.
* Remove one mass from the trolley and add it to the end of the string the accelerating force is now increased but with the same total mass.
* Measure the new acceleration for the new accelerating force
* Complete for other readings.

**Risk Assessment**

* Masses may be heavy so care must be taken to not drop them.
* Place a buffer at the end of the ramp or something soft for the trolley to land in is suggested to prevent damage to equipment.
* Do an electrical safety check by observing all the wires.
* Make sure the vehicle cannot become a trip hazard or land on feet, toes etc.
* Be observant to those around you.
* Do not block exits with the apparatus.
* **Mrsphysics takes no responsibility for any health and safety. It is the responsibility of the teacher and student to risk assess any practical activity they complete!**
* **Sept 2023**