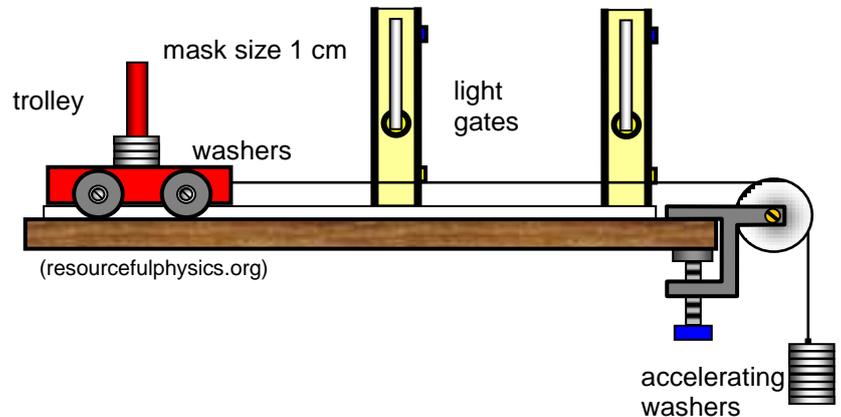


Variation of mass with the acceleration of an object

Apparatus

a trolley, a white plastic track, a pulley, thread, twelve washers (mass 10 g each, or 10 g masses and a holder), metre rule, light gates and timer or stopwatches, scales.



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 of the weights on the end of the string. In this experiment the mass of the vehicle will be altered but the force remains constant.

Instructions:

- Set up your apparatus as shown in the diagram.
- Compensate for friction by tilting the track slightly so that the trolley runs steadily down with no change in speed when there is no force pulling it.
- Set up the interface to measure the acceleration of the trolley.
- Add washers or weights on the string which will be the constant accelerating force.
- The mass to be accelerated is the mass of the trolley.
- Allow the trolley to accelerate down the track and record the acceleration from the computer.
- Change the mass of the trolley and repeat the measurements including measuring the new mass of the trolley.

Risk Assessment

- Masses may be heavy so care must be taken to not drop them.
- Placing a buffer at the end of the ramp or something soft for the trolley to land in is suggested so not to damage 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.

Background

1. <http://www.physicsclassroom.com/class/newtlaws/Lesson-3/Newton-s-Second-Law>
2. <https://thefma.co.uk/>
3. <http://www.fmauk.org/>
4. <https://physics.info/newton-second/>
5. http://tap.iop.org/mechanics/newton/page_39590.html
6. http://www.bbc.co.uk/schools/gcsebitesize/science/add_ocr_gateway/forces/motionrev1.shtml
7. <http://zonalandeducation.com/mstm/physics/mechanics/forces/newton/mightyFEqMA/mightyFEqMA.html>
8. <http://www.physics-s3.org.uk/ExampleExperiment/NLaws-1.htm>
9. http://www.antonine-education.co.uk/Pages/Physics_GCSE/Unit_2/Add_02_Forces_and_Motion/add_page_02.htm
10. https://honorsphysicsrocks.wikispaces.com/Group5_2_ch4
11. <https://kellyoshea.blog/2011/11/16/building-the-unbalanced-force-particle-model/>