AQA Physics GCSE

RP07- Acceleration

Flashcards

Part 1: Measuring the effect of force on acceleration at constant mass.

Outline the basic steps of the practical.

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1. Mark out 20 cm intervals on a bench using a ruler
2. Attach a string to the trolley, and pass it over a pulley at the end of the bench
3. Attach varying masses to the end of the string and release them so the trolley accelerates
4. Time how long it takes to reach each interval

Suggest a method for marking out 20cm intervals on the desk.

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Place pieces of tape every 20cm from the starting point of the trolley. Use a metre rule to measure each interval.

What piece of equipment is used to record the times?

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A stopwatch with the ability to record multiple times (laps) so you can record when it passes each interval.

What safety precaution should be taken when releasing the masses?

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Ensure you are not standing underneath where they are hanging. A padded bucket could be placed underneath them to catch them when they drop.

How would you expect the acceleration of the trolley to change as you add more weights to the end of the spring?

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The more weights that are added, the greater the force that is accelerating the trolley and so the greater the acceleration.

Which of Newton's laws explains the relationship between force and acceleration? State the relevant equation.

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Newton's Second Law

Force = Mass x Acceleration

Part 2: Measuring the effect of mass on acceleration at constant force.

Outline the basic steps of the practical.

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1. Mark out 20 cm intervals on a bench
2. Attach a string to the trolley, and pass it over a pulley at the end of the bench
3. Attach a fixed mass to the end of the string and release it so the trolley accelerates
4. Time how long it takes to reach each interval
5. Repeat with varying masses attached to the trolley

How can you choose an appropriate quantity of masses to use as the fixed mass for this experiment?

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Carry out a preliminary experiment to find what weight is needed to just accelerate the trolley from rest.

What would be the consequence of using too large a fixed weight?

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The trolley would accelerate too quickly for the timing at each interval to be accurate.

How would you expect the acceleration of the trolley to change when you add masses onto the trolley?

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The acceleration will decrease as masses are added to the trolley, because $a = F/m$.

Suggest a way that the experiment could be changed to improve the timing of the trolley at each interval.

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A video camera could be used to record the experiment and then timings taken from the slowed down video afterwards. This reduces uncertainty from human reaction times. Alternatively, light gates could be used.