Edexcel Physics GCSE

Practical 1: Motion and Forces

Practical Flashcards

Outline the basic steps of the practical.

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1. Measure the mass of the trolley, place it at the top of the ramp and set up light gates in two positions along the ramp
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. Repeat with varying masses attached to the trolley

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

What should be used to measure the mass of the trolley before masses are added?

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An electric balance, which is zeroed before placing the trolley on.

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.

$$a = F / m$$

Explain why two light gates are required to carry out the timing.

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Each lightgate can be used to calculate an average speed at that point. Two are needed so that the acceleration between the two gates can be calculated.

What must be attached to the trolley for the lightgate system to work?

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A piece of card to cut the beam as the trolley passes through. The length of card should be inputted into the software.

How is the average speed at each lightgate calculated?

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The light gate times how long the beam is cut off by the card for. The length of the card is known, so average speed can be calculated using:

Speed = Distance/Time.

How can the acceleration of the trolley between the two light gates be calculated?

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The difference between the speed at each gate will give a value for change of velocity, which can be used for:

Acceleration = Change in Velocity / Time

What should the graph of acceleration against mass look like?

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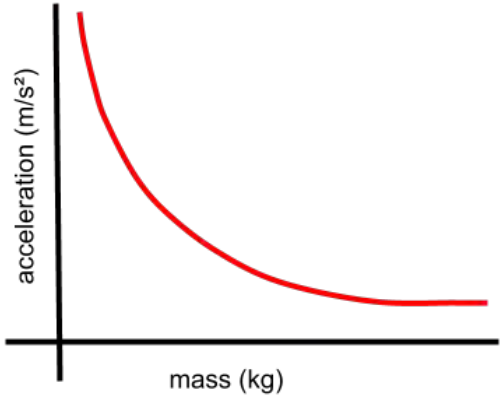

What could be plotted to produce a straight line graph?

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Acceleration against the reciprocal of mass (1/mass).

What safety precautions should be taken when carrying out this experiment?

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- Place something soft below the falling mass, and avoid standing near where the mass is hanging
- Ensure masses are securely attached to the trolley