OCR (A) Physics GCSE

PAG 03 - Investigating the acceleration of a trolley down a ramp

Flashcards

What apparatus is used to measure speeds and times more accurately?

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A light gate (or set of light gates).

How can you find the average speed of a trolley down a ramp?

How can you find the average speed of a trolley down a ramp?

Record the distance travelled (using a ruler) and the time taken (using a stopwatch) for the trolley to travel the measured distance. Then apply the formula:

Average speed = distance / time

What is the initial velocity of a trolley rolling down a ramp?

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0 m/s (provided it is released from rest, not pushed).

How can you calculate the acceleration of a trolley without a light gate?

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- Record the distance, s, using a ruler
- Release the trolley from rest so the initial velocity is 0 m/s
- Record the time taken, t, using a stopwatch
- Apply the equation: $s = ut + \frac{1}{2} at^2$

What is the equation used to calculate acceleration from initial velocity, time and distance, and how is it rearranged for acceleration?

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$$s = ut + \tfrac{1}{2}at^2$$

This is rearranged to

$$a = \frac{2(s - ut)}{t^2}$$

How should 2 light gates be set up to investigate the motion of a trolley?

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- One just below the release point
- One at the bottom of the slope

How can 2 light gates be used to work out the acceleration of the trolley?

How can 2 light gates be used to calculate the acceleration of the trolley?

- Record the distance between them
- The light gates will record the speed of the trolley as it passes through them and the time taken to pass between them
- Use the equation a = (v-u)/t

How should 1 light gate be set up to investigate the motion of a trolley?

How should 1 light gates be set up to investigate the motion of a trolley?

Position the light gate at the bottom of the slope.

How can 1 light gate be used to work out the acceleration of the trolley?

How can 1 light gate be used to calculate the acceleration of the trolley?

- Measure the time taken from the release to the trolley passing through the light gate
- The light gate will record the final velocity, v
  - u is 0 m/s
  - Use the equation a = (v-u)/t