

WJEC England Physics GCSE

SP4.2: Acceleration

Practical Flashcards

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Outline the basic steps of the practical.

1. Incline the ramp so the high end is 10 cm above the desk.
2. Measure 50 cm along the desk from the bottom of the ramp.
3. Release the ball from the top of the ramp and start the stopwatch.
4. Press the lap button when it reaches the bottom of the ramp.
5. Stop the stopwatch when the ball reaches the 50 cm mark on the desk.
6. Record the two times and repeat for different incline heights.



How do you calculate the time it took for the ball to travel 50 cm along the desk?



How do you calculate the time it took for the ball to travel 50 cm along the desk?

Subtract the time it took to reach the bottom of the ramp (lap time) from the total time for the whole journey (final time).



What formula is used to calculate the velocity of the ball at the bottom of the ramp?



What formula is used to calculate the velocity of the ball at the bottom of the ramp?

$$\text{Velocity} = \frac{0.5}{\text{Time taken to travel 50 cm along the desk}}$$



What formula is used to calculate the acceleration of the ball?



What formula is used to calculate the acceleration of the ball?

$$\text{Acceleration} = \frac{\text{Velocity at bottom of the ramp}}{\text{Time to reach bottom of the ramp}}$$



What graph can be plotted with the data?



What graph can be plotted with the data?

A graph of the ramp height against acceleration.



What energy transfers take place in this experiment?



What energy transfers take place in this experiment?

Gravitational potential energy (GPE) is converted to kinetic energy (KE) as the ball rolls down the ramp. Work will also be done against friction as it rolls.



How should the velocity at the bottom of the ramp vary as the height of the ramp increases? Why?



How should the velocity at the bottom of the ramp vary as the height of the ramp increases? Why?

The velocity should increase with height, because the ball has more GPE to convert to KE the higher the ramp is.



What force causes the ball to accelerate down the ramp?



What force causes the ball to accelerate down the ramp?

The acceleration is caused by a resultant force acting down the ramp, which is due to the weight of the ball.



What is weight?



What is weight?

The force that acts on an object due to gravity and the mass of the object.



What quantities does weight depend on?



What quantities does weight depend on?

$$\text{Weight} = \text{Mass} \times \text{Gravitational field strength}$$

1. The mass of the object.
2. The gravitational field strength at the given position in the field.



How could the timing element of this experiment be improved?



How could the timing element of this experiment be improved?

Light gates could be used at the top and bottom of the ramp and at the 50 cm mark to remove the uncertainty caused by human reaction time.

