CW

1st July 2025

A-Level Physics Induction

Learning Objective

- To investigate the value of gravity

Starter

Define acceleration

How do you calculate acceleration?

Brain dump anything else that you can recall about acceleration

Acceleration is the rate of change of velocity

Acceleration = change in velocity ÷ time

Measure in meters per second squared, m/s^2

Acceleration is a vector - it has magnitude and direction

Negative acceleration is called retardation

Acceleration can be calculated using the gradient of a velocity-time graph

AS-Physics (Year 12)

Two written papers		
Paper 1: • Measurement and their errors • Particles and radiation • Waves • Mechanics and materials • Electricity	**50%**	**Written exam:** **1 hour 30 mins** **70 marks**
Paper 2: • All topics • Practical skills • Data analysis	**50%**	**Written exam:** **1 hour 30 mins** **70 marks**

A level-Physics (Year 13)

Paper 1: • Measurements and errors • Particles and radiation • Waves • Mechanics and materials • Electricity • Further Mechanics (Periodic motion)	34%	• Written exam: 2 hours • 85 marks
Paper 2: • Thermal physics • Fields and their consequences • Nuclear physics	34%	• Written exam: 2 hours • 85 marks
Paper 3: • Practical skills • Data analysis • Astrophysics	32%	• Written exam: 2 hours • 80 marks

Newton's Dynamic Equations

- $u = v + at$
- $v^2 = u^2 + 2as$
- $s = ut + \frac{1}{2}at^2$
- $s = \frac{1}{2}(u + v)t$

u = initial velocity

v = final velocity

a = acceleration

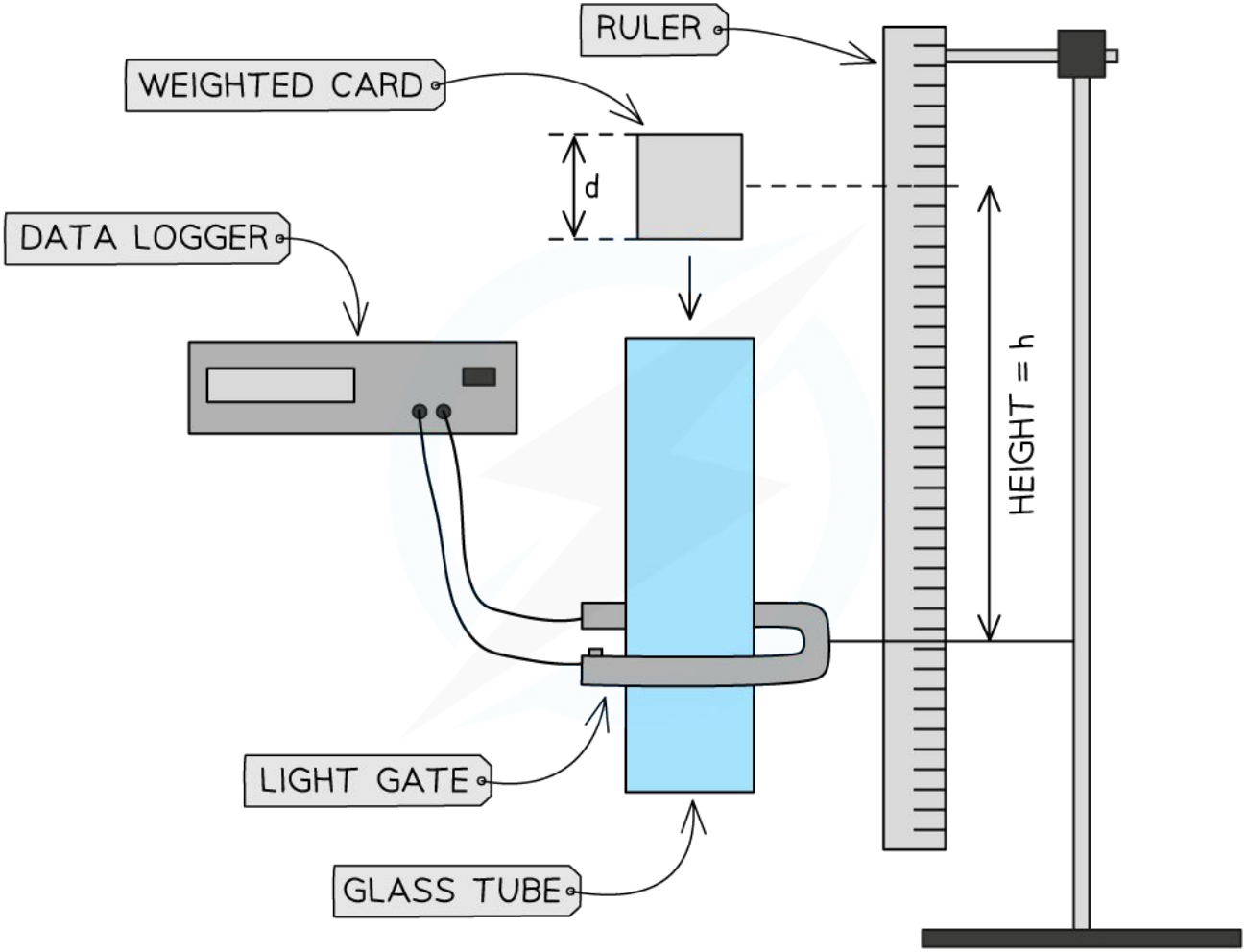
s = displacement

t = time

Worked example

A ball is released from a height of 1.20 m above a concrete floor. It starts at a velocity of 0 m/s and increases to a velocity of 4.85 m/s.

Calculate the acceleration of the ball due to gravity.



- Attach the light gate about 20 cm above the bench
- Clamp the metre ruler vertically next to the tube so that the vertical distance from the top of the tube to the light gate can be accurately measured
- Record the distance between the light gate and the top of the tube as displacement, s
- Hold the ball at the top of the tube and release it so that it falls through the light gate
- Repeat this measurement from the same height two more times
- Increase the displacement by 20 cm
- Repeat for each height value

Displacement / m	Velocity / ms^{-1}	Velocity squared
0.2		
0.4		
0.6		
0.8		

Alternative method

Simulation version of practical

https://www.focuselearning.co.uk/s/27m9zf957o3c

Plot v^2 / s = gradient

a = gradient / 2

a = 9.81 ms^{-2} (fingers crossed)