FORMULA SHEET

GCSE and IGCSE physics equation sheet

AQA prints all 35 GCSE Physics equations on the sheet for 2025 to 2027 exams, while the Cambridge IGCSE syllabus expects you to recall its equations.

IN THE BOOKLET printed in the official booklet or sheet in the exam LEARN IT students must recall it

Energy, work and power

Rows marked 'recall list' are the ones the AQA specification says you should be able to recall; every row is printed on the exam sheet for 2025 to 2027. Older AQA sheets printed only the 12 'sheet list' equations.

Kinetic energy Spec: recall list. E_k in joules (J), m in kg, v in m/s.	$E_k = \frac{1}{2}mv^2$	IN THE BOOKLET
Gravitational potential energy Spec: recall list. E_p in J, m in kg, g in N/kg (gravitational field strength), h in m.	$E_p = mgh$	IN THE BOOKLET
Elastic potential energy Spec: equation sheet list. E_e in J, k spring constant in N/m, e extension in m. Limit of proportionality only.	$E_e = \frac{1}{2}ke^2$	IN THE BOOKLET
Work done Spec: recall list. W in J, F in N, s in m along the line of action of the force.	$W = Fs$	IN THE BOOKLET
Power (energy) Spec: recall list. P in watts (W), E in J, t in seconds (s).	$P = \frac{E}{t}$	IN THE BOOKLET
Power (work) Spec: recall list. W in J, t in s. A watt is one joule per second.	$P = \frac{W}{t}$	IN THE BOOKLET
Efficiency (energy) Spec: recall list. A ratio with no units. Multiply by 100 for a percentage.	$\text{efficiency} = \frac{\text{useful output energy transfer}}{\text{total input energy transfer}}$	IN THE BOOKLET
Efficiency (power) Spec: recall list. Same idea using power in W.	$\text{efficiency} = \frac{\text{useful power output}}{\text{total power input}}$	IN THE BOOKLET

Thermal energy, density and pressure

Change in thermal energy Spec: equation sheet list. Δ E in J, m in kg, c specific heat capacity in J/kg °C, Δθ temperature change in °C.	$\Delta E = mc\Delta\theta$	IN THE BOOKLET
Thermal energy for a change of state Spec: equation sheet list. E in J, m in kg, L specific latent heat in J/kg.	$E = mL$	IN THE BOOKLET
Density Spec: recall list. ρ in kg/m^3, m in kg, V in m^3.	$\rho = \frac{m}{V}$	IN THE BOOKLET

Pressure Spec: recall list. Physics only. p in pascals (Pa), F in N (normal to the surface), A in m^2.	$p = \frac{F}{A}$	IN THE BOOKLET
Pressure due to a column of liquid Spec: equation sheet list. Physics only and Higher Tier only. p in Pa, h in m, ρ in kg/m^3, g in N/kg.	$p = h\rho g$	IN THE BOOKLET
Gas pressure and volume Spec: equation sheet list. Physics only. For a fixed mass of gas at constant temperature. p and V can be in any consistent units.	$pV = \text{constant}$	IN THE BOOKLET

Forces and motion

Weight Spec: recall list. W in N, m in kg, g in N/kg.	$W = mg$	IN THE BOOKLET
Force and spring extension Spec: recall list. F in N, k in N/m, e in m. Up to the limit of proportionality.	$F = ke$	IN THE BOOKLET
Moment of a force Spec: recall list. Physics only. M in newton metres (N m), F in N, d in m measured at right angles to the force.	$M = Fd$	IN THE BOOKLET
Distance travelled Spec: recall list. s in m, v in m/s, t in s.	$s = vt$	IN THE BOOKLET
Acceleration Spec: recall list. a in m/s^2, Δ v change in velocity in m/s, t in s.	$a = \frac{\Delta v}{t}$	IN THE BOOKLET
Uniform acceleration Spec: equation sheet list. v final and u initial velocity in m/s, a in m/s^2, s in m.	$v^2 - u^2 = 2as$	IN THE BOOKLET
Newton's second law Spec: recall list. F is the resultant force in N, m in kg, a in m/s^2.	$F = ma$	IN THE BOOKLET
Momentum Spec: recall list. Higher Tier only. p in kg m/s, m in kg, v in m/s.	$p = mv$	IN THE BOOKLET
Force and change in momentum Spec: equation sheet list. Physics only and Higher Tier only. mΔ v is the change in momentum in kg m/s, Δ t in s.	$F = \frac{m\Delta v}{\Delta t}$	IN THE BOOKLET

Waves

Wave speed Spec: recall list. v in m/s, f frequency in hertz (Hz), λ wavelength in m.	$v = f\lambda$	IN THE BOOKLET
Period Spec: equation sheet list. T in s, f in Hz.	$T = \frac{1}{f}$	IN THE BOOKLET
Magnification Spec: equation sheet list. Physics only (lenses). A ratio, so both heights must use the same unit.	$\text{magnification} = \frac{\text{image height}}{\text{object height}}$	IN THE BOOKLET

Electricity

Charge flow Spec: recall list. Q in coulombs (C), I in amperes (A), t in s.	$Q = It$	IN THE BOOKLET
Potential difference Spec: recall list. V in volts (V), I in A, R resistance in ohms (Ω).	$V = IR$	IN THE BOOKLET
Electrical power Spec: recall list. P in W, V in V, I in A.	$P = VI$	IN THE BOOKLET
Power in a resistor Spec: recall list. P in W, I in A, R in Ω.	$P = I^2R$	IN THE BOOKLET
Energy transferred (power) Spec: recall list. E in J, P in W, t in s.	$E = Pt$	IN THE BOOKLET
Energy transferred (charge) Spec: recall list. E in J, Q in C, V in V.	$E = QV$	IN THE BOOKLET

Magnetism and transformers

All three are Higher Tier only. The Combined Science 8464 sheet prints F = BIl and V_p I_p = V_s I_s but not the turns ratio.

Force on a conductor in a magnetic field Spec: equation sheet list. Higher Tier only. F in N, B magnetic flux density in tesla (T), I in A, l length in m. Conductor at right angles to the field.	$F = BIl$	IN THE BOOKLET
Transformer: turns ratio Spec: equation sheet list. Higher Tier only. Physics only on the printed sheet. p is primary, s is secondary, n is number of turns.	$\frac{V_p}{V_s} = \frac{n_p}{n_s}$	IN THE BOOKLET
Transformer: power in equals power out Spec: equation sheet list. Higher Tier only. For a 100 per cent efficient transformer.	$V_pI_p = V_sI_s$	IN THE BOOKLET

Rules in the specification that the sheet does not print

These are in the AQA specification content but are not on the Physics Equations Sheet, so you must know them.

Series circuit: total resistance Same current through each component. Total p.d. is shared between components.	$R_{\text{total}} = R_1 + R_2$	LEARN IT
Parallel circuit: total current Same p.d. across each branch. Total resistance is less than the smallest resistor.	$I_{\text{total}} = I_1 + I_2$	LEARN IT
Conservation of momentum Higher Tier only. In a closed system. Use p = m v on each object, with direction as positive or negative.	$\text{total momentum before} = \text{total momentum after}$	LEARN IT
Work done and energy Use with W = F s when a force moves an object, for example against friction.	$\text{work done} = \text{energy transferred}$	LEARN IT

Equations other boards print that AQA does not

Cambridge IGCSE Physics 0625 and Pearson Edexcel International GCSE Physics 4PH1 include these. 'Given' is left blank here because it depends on the board: see the next part of the page.

Refractive index (Cambridge Supplement, Edexcel list) Cambridge: recall and use (Supplement). Edexcel: printed on the equation list.	$n = \frac{\sin i}{\sin r}$	SEE NOTE
Critical angle (Cambridge Supplement, Edexcel list) Same as n = 1 / sin c.	$\sin c = \frac{1}{n}$	SEE NOTE
Orbital speed (Cambridge Supplement, Edexcel list) r orbital radius in m, T orbital period in s.	$v = \frac{2\pi r}{T}$	SEE NOTE
Pressure and temperature of a gas (Edexcel list) Fixed mass at constant volume. T must be in kelvin.	$\frac{p_1}{T_1} = \frac{p_2}{T_2}$	SEE NOTE
Kelvin and Celsius (Cambridge) Cambridge syllabus: recall and use.	$T\,(\text{in K}) = \theta\,(\text{in }^\circ\text{C}) + 273$	SEE NOTE
Energy from current, voltage and time (Edexcel list) Combines P = IV and E = Pt.	$E = IVt$	SEE NOTE

What Cambridge and Edexcel give you

Read this before you assume a sheet will be in the room: the two boards differ from AQA.

Cambridge IGCSE Physics 0625: what the syllabus says The 2026 to 2028 syllabus uses 'recall and use' for its equations in both Core and Supplement. It lists no equation sheet, so treat every equation as one to memorise.	recall and use $F = ma$, $\rho = \frac{m}{V}$, $V = IR \ldots$	SEE NOTE
Edexcel International GCSE Physics 4PH1: what the list gives Pearson provides an Equation List for 2025 to 2027 and has said the same will apply from 2028. The main list is for 4PH1 and 4SD0 papers; extra equations (momentum, F = change in momentum over time, moment, thermal energy, transformers, redshift) are for Physics papers 2P and 2PR only.	Equation List in the exam room	SEE NOTE
Edexcel list does not print everything The main part prints F = ma, W = mg, P = IV, Q = It, V = IR, wave speed and f = 1/T, but not P = I^2 R, specific latent heat or Hooke's law. Thermal energy and moment appear only in the extra part for papers 2P and 2PR.	$\text{average speed} = \frac{\text{distance moved}}{\text{time taken}}$	SEE NOTE

Learn these: not in the booklet

Series resistance

$R_{\text{total}} = R_1 + R_2$

Parallel circuits

$I_{\text{total}} = I_1 + I_2$

The potential difference is the same across each branch.

Conservation of momentum (Higher Tier)

Total momentum before an event equals total momentum after it, in a closed system.

Work done

$$W = Fs$$

Work done equals energy transferred.

Using the sheet in the exam

- Scan the sheet for the quantity you are asked for, then check the unit in the question before you substitute.
- Convert units first: grams to kilograms, centimetres to metres, minutes to seconds, kilowatts to watts.
- Write the equation, then the substitution, then the answer with its unit. Marks are for each stage.
- Pick the right power equation: P = E/t, P = W/t, P = VI or P = I^2 R depending on the data you are given.
- Foundation students can skip equations marked Higher Tier only, and Combined Science students can skip those marked physics only.

Checked against the official documents: AQA GCSE Physics 8463, Physics Equations Sheet, GCSE Physics (8463), for use in June 2027 only (35 equations), and specification Appendix A; AQA GCSE physics specification, Appendix A, Appendix A: Physics equations; AQA Combined Science Trilogy 8464, Physics Equations Sheet (for use in June 2024); AQA news: equation sheets 2027 and 2028 onwards, GCSE Maths and GCSE Sciences formulae and equation sheets for 2027 and 2028 onwards; Cambridge IGCSE Physics 0625, Syllabus for examination in 2026, 2027 and 2028; Pearson Edexcel International GCSE Physics 4PH1, Specification Issue 4, Appendix 7, and Equation List for May to June 2025; Pearson: International science qualification news, June 2026, Equation sheets for 2028 onwards. Updated 31 October 2026. Boards update their booklets from time to time: always practise with the version your exam uses. More free sheets and topic worksheets at curatedprep.com.