GCSE ONLINE TUTORING

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PEARSON EDEXCEL GCSE (9-1) PHYSICS 1PH0

FOUNDATION + HIGHER

EQUATIONS, METHODS & PRACTICAL-MATHS HANDBOOK

Foundation + Higher | current equation-sheet regime | worked independent examples

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Current equation-sheet regime

2026-2028+ position

Pearson supplied an equation sheet in Summer 2026 and will do so in 2027. Ofqual has decided that equation sheets must continue from 2028 for the remaining lifetime of the current GCSE Physics specification. Students still need to recognise quantities, choose the correct relationship, rearrange it, convert units and interpret the result.

Method: equation selection in five moves

- Write the physical quantity being asked for, with its unit.
- List the quantities you are given and convert to compatible units.
- Choose a relationship that connects the target quantity to those known quantities.
- Rearrange symbolically where helpful, then substitute.
- Check magnitude, unit and physical sense before finalising.

01. distance = average speed × time

Tier / spec ref	Meaning & conditions	Worked independent example	Common trap
Both | 2.6b	Distance in m, speed in m/s, time in s.	A car averages 18 m/s for 25 s: d = 450 m.	Convert minutes/hours first.

02. a = (v-u)/t

Tier / spec ref	Meaning & conditions	Worked independent example	Common trap
Both | 2.8	Acceleration is change in velocity per second.	u=4, v=16 m/s, t=6 s -> a=2 m/s².	Keep direction/sign consistent.

03. $v^2-u^2 = 2ax$

Tier / spec ref	Meaning & conditions	Worked independent example	Common trap
Both | 2.9	Constant-acceleration relationship.	u=0, a=3, x=24 -> v=12 m/s.	Only use when acceleration is constant.

04. F = ma

Tier / spec ref	Meaning & conditions	Worked independent example	Common trap
Both | 2.15	Resultant force, kg, m/s².	m=7 kg, a=2.5 -> F=17.5 N.	Use resultant force, not one component force.

05. W = mg

Tier / spec ref	Meaning & conditions	Worked independent example	Common trap
Both | 2.16	Weight is gravitational force.	m=3 kg, g=9.8 -> W=29.4 N.	Mass is kg; weight is N.

06. p = mv

Tier / spec ref	Meaning & conditions	Worked independent example	Common trap
Higher | 2.24	Momentum includes direction.	0.4 kg at 12 m/s -> 4.8 kg m/s.	Use signed velocity in collisions.

07. F = Δp/t

Tier / spec ref	Meaning & conditions	Worked independent example	Common trap
Higher | 2.26	Average force from rate of momentum change.	Δp=36 kg m/s in 0.12 s -> 300 N.	Convert milliseconds.

08. ΔGPE = mgΔh

Tier / spec ref	Meaning & conditions	Worked independent example	Common trap
Both | 3.1 / 8.8	Energy store change due to height.	2 kg raised 5 m, g=9.8 -> 98 J.	Use vertical height change.

09. KE = 1/2 mv²

Tier / spec ref	Meaning & conditions	Worked independent example	Common trap
Both | 3.2 / 8.9	Kinetic energy depends on speed squared.	m=800 kg, v=10 -> 40,000 J.	Square speed, not mass.

10. efficiency = useful output / total input

Tier / spec ref	Meaning & conditions	Worked independent example	Common trap
Both | 3.11 / 8.15	Use energy or power consistently.	420 J useful from 600 J -> 0.70 or 70%.	Denominator is total input.

11. v = fλ

Tier / spec ref	Meaning & conditions	Worked independent example	Common trap
Both | 4.6	Wave speed = frequency × wavelength.	f=250 Hz, λ=1.2 m -> 300 m/s.	Match wavelength units to desired speed units.

12. v = x/t

Tier / spec ref	Meaning & conditions	Worked independent example	Common trap
Both | 4.6	Speed from distance and time.	12 m in 0.04 s -> 300 m/s.	Use travel distance not wavelength unless appropriate.

13. E = Fd

Tier / spec ref	Meaning & conditions	Worked independent example	Common trap
Both | 8.6	Work done / energy transferred by force along displacement.	35 N through 4 m -> 140 J.	Use displacement in force direction.

14. P = E/t

Tier / spec ref	Meaning & conditions	Worked independent example	Common trap
Both | 8.13 / 10.29	Rate of energy transfer.	900 J in 30 s -> 30 W.	Power is not energy.

15. moment = force × perpendicular distance

Tier / spec ref	Meaning & conditions	Worked independent example	Common trap
Physics-only | 9.7P	Turning effect around pivot.	20 N at 0.35 m -> 7 N m.	Distance must be perpendicular.

16. E = QV

Tier / spec ref	Meaning & conditions	Worked independent example	Common trap
Both | 10.6	Electrical energy transferred by charge through p.d.	12 C through 6 V -> 72 J.	Q is charge, not current.

17. Q = It

Tier / spec ref	Meaning & conditions	Worked independent example	Common trap
Both | 10.9	Charge flow = current × time.	2.5 A for 40 s -> 100 C.	Seconds, not minutes.

18. V = IR

Tier / spec ref	Meaning & conditions	Worked independent example	Common trap
Both | 10.13	Potential difference = current × resistance.	0.4 A × 30 Ω -> 12 V.	Filament resistance is not constant as temperature changes.

19. E = IVt

Tier / spec ref	Meaning & conditions	Worked independent example	Common trap
Both | 10.27	Electrical energy from current, voltage and time.	2 A, 12 V, 30 s -> 720 J.	Use seconds for joules.

20. P = IV

Tier / spec ref	Meaning & conditions	Worked independent example	Common trap
Both | 10.31	Electrical power.	230 V × 3 A -> 690 W.	Do not confuse with E=QV.

21. $P = I^2R$

Tier / spec ref	Meaning & conditions	Worked independent example	Common trap
Both | 10.31	Power dissipated in resistance.	2 A through 5 Ω -> 20 W.	Square current.

22. F = BIl

Tier / spec ref	Meaning & conditions	Worked independent example	Common trap
Higher | 12.13	Motor-effect force for conductor at right angles.	B=0.5 T, I=3 A, l=0.2 m -> 0.3 N.	Requires perpendicular orientation for this form.

23. Vp/Vs = Np/Ns

Tier / spec ref	Meaning & conditions	Worked independent example	Common trap
Physics-only | 13.7P	Ideal transformer voltage-turns ratio.	Np=500, Ns=100, Vp=230 -> Vs=46 V.	Keep primary/secondary paired.

24. VpIp = VsIs

Tier / spec ref	Meaning & conditions	Worked independent example	Common trap
Both | 13.10	Ideal 100%-efficient transformer power balance.	230×0.2 = 46×Is -> Is=1.0 A.	Real transformers have losses; this is ideal relation.

25. ρ = m/V

Tier / spec ref	Meaning & conditions	Worked independent example	Common trap
Both | 14.2	Density = mass per volume.	0.54 kg / 0.0002 m^3 = 2700 kg/m^3.	Use consistent mass/volume units.

26. $\Delta Q = mc\Delta\theta$

Tier / spec ref	Meaning & conditions	Worked independent example	Common trap
Both | 14.8	Thermal energy for temperature change.	2 kg water, c=4200, Δθ=5 -> 42,000 J.	Not used for state change plateau.

27. Q = mL

Tier / spec ref	Meaning & conditions	Worked independent example	Common trap
Both | 14.9	Latent energy for change of state.	0.5 kg × 334000 J/kg -> 167000 J.	Choose correct latent heat.

28. P1V1 = P2V2

Tier / spec ref	Meaning & conditions	Worked independent example	Common trap
Physics-only | 14.19P	Fixed mass gas at constant temperature.	100 kPa×60 cm^3 = 150 kPa×V2 -> 40 cm^3.	Temperature must be constant.

29. F = kx

Tier / spec ref	Meaning & conditions	Worked independent example	Common trap
Both | 15.3	Spring force in linear elastic region.	k=250 N/m, x=0.04 m -> 10 N.	x means extension, not length.

30. $E = 1/2\ kx^2$

Tier / spec ref	Meaning & conditions	Worked independent example	Common trap
Both | 15.4	Elastic energy in linear spring.	k=100, x=0.2 -> 2 J.	Extension in metres and square it.

31. P = F/A

Tier / spec ref	Meaning & conditions	Worked independent example	Common trap
Physics-only | 15.11P	Pressure from normal force over area.	600 N/0.03 m^2 -> 20,000 Pa.	Area in m^2 for Pa.

32. P = hρg

Tier / spec ref	Meaning & conditions	Worked independent example	Common trap
Higher physics-only | 15.14P	Liquid pressure from depth, density and g.	h=2 m, ρ=1000, g=9.8 -> 19,600 Pa.	Depth is vertical height of liquid column.

Core-practical maths toolkit

2.19 Force, mass and acceleration

Plot acceleration against force for constant mass or acceleration against inverse mass for constant force; identify uncertainty from timing/friction.

- Before calculating: write units for every measured column.
- Graph: state which variable belongs on each axis and whether a best-fit line/curve is appropriate.
- Evaluation: distinguish measurement resolution, scatter/random uncertainty and systematic bias.

4.17 Wave speed, frequency and wavelength

Use v=fλ; repeat measurements across multiple wavelengths to reduce percentage uncertainty.

- Before calculating: write units for every measured column.
- Graph: state which variable belongs on each axis and whether a best-fit line/curve is appropriate.
- Evaluation: distinguish measurement resolution, scatter/random uncertainty and systematic bias.

5.9 Refraction through rectangular glass

Draw normal accurately, mark rays before removing block, compare i and r; repeated angles expose systematic alignment error.

- Before calculating: write units for every measured column.
- Graph: state which variable belongs on each axis and whether a best-fit line/curve is appropriate.
- Evaluation: distinguish measurement resolution, scatter/random uncertainty and systematic bias.

5.19P Thermal radiation and surface

Plot temperature against time or compare temperature drop over a fixed interval; discuss convection/conduction controls.

- Before calculating: write units for every measured column.
- Graph: state which variable belongs on each axis and whether a best-fit line/curve is appropriate.
- Evaluation: distinguish measurement resolution, scatter/random uncertainty and systematic bias.

10.17 Electrical circuits and I-V characteristics

Plot I against V (or V against I consistently); calculate resistance V/I; explain lamp non-linearity through heating.

- Before calculating: write units for every measured column.
- Graph: state which variable belongs on each axis and whether a best-fit line/curve is appropriate.
- Evaluation: distinguish measurement resolution, scatter/random uncertainty and systematic bias.

14.3 Density of solids and liquids

Use rho=m/V with consistent units; repeat volume measurements; subtract container mass for liquids.

- Before calculating: write units for every measured column.
- Graph: state which variable belongs on each axis and whether a best-fit line/curve is appropriate.
- Evaluation: distinguish measurement resolution, scatter/random uncertainty and systematic bias.

14.11 Properties of water

Use $\Delta Q = mc\Delta\theta$; recognise energy losses; melting plateau corresponds to latent energy transfer.

- Before calculating: write units for every measured column.
- Graph: state which variable belongs on each axis and whether a best-fit line/curve is appropriate.
- Evaluation: distinguish measurement resolution, scatter/random uncertainty and systematic bias.

15.6 Spring extension and work done

Plot F against x; gradient in linear region gives k depending axis choice; area under force-extension graph gives energy transferred.

- Before calculating: write units for every measured column.
- Graph: state which variable belongs on each axis and whether a best-fit line/curve is appropriate.
- Evaluation: distinguish measurement resolution, scatter/random uncertainty and systematic bias.

Units and conversions that repeatedly cost marks

Conversion	Rule	Example
g -> kg	divide by 1000	750 g = 0.750 kg
cm -> m	divide by 100	25 cm = 0.25 m
cm^2 -> m^2	divide by 10,000	300 cm^2 = 0.0300 m^2
cm^3 -> m^3	divide by 1,000,000	500 cm^3 = 0.000500 m^3
min -> s	multiply by 60	2.5 min = 150 s
kW -> W	multiply by 1000	1.8 kW = 1800 W
kJ -> J	multiply by 1000	42 kJ = 42000 J
mA -> A	divide by 1000	250 mA = 0.250 A
kPa -> Pa	multiply by 1000	120 kPa = 120000 Pa

References and evidence base

All publication claims and mappings in this handbook were checked against the sources below. Accessed 12 November 2026. Where examiner reports were not publicly available for a recent series, this handbook does not invent examiner-frequency claims.

[SPEC] Pearson Edexcel GCSE (9-1) Physics (1PH0), Specification Issue 4, March 2024
https://qualifications.pearson.com/content/dam/pdf/GCSE/Science/2016/Specification/gcse-physics-spec.pdf

[EQ] Pearson science update: GCSE Physics and Combined Science equation sheets
https://qualifications.pearson.com/en/news-policy/subject-updates/Science/october-2026-teaching-science-update.html

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https://www.gov.uk/government/consultations/proposed-changes-to-the-assessment-of-mathematics-physics-and-combined-science-gcses

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