GCSE ONLINE TUTORING

IN PARTNERSHIP WITH RS REMOTE TUTORING

PEARSON EDEXCEL GCSE (9-1) PHYSICS 1PH0

FOUNDATION + HIGHER

# COMMON MISTAKES & DIAGNOSTIC REPAIR HANDBOOK

Foundation + Higher | misconception -> repair routine -> retest

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# Evidence labels

### How to read the labels

ER = supported by a publicly available Pearson examiner report. SPEC = independently authored diagnostic risk derived from the specification and assessment demands. A label does not mean Pearson has published a frequency percentage.

Pearson's 2023 Higher Paper 2 report noted that stronger candidates were familiar with practical work and equations, while weaker responses showed gaps in procedural knowledge, SI-unit conversion and applying physics to unfamiliar contexts. This handbook uses those themes without copying report wording.

## 01. Units before equations

| Tier | Typical error | Repair routine | Rapid retest | Evidence |
|---|---|---|---|---|
| Both | Students substitute cm, g, minutes or kPa into an SI-form equation without conversion. | Convert first; write a one-line unit gate before substitution. | Can you turn 250 g into kg and 3.2 cm into m without a calculator? | SPEC/ER23P2H |

## 02. Scalar vs vector

| Tier | Typical error | Repair routine | Rapid retest | Evidence |
|---|---|---|---|---|
| Both | Distance/displacement and speed/velocity are interchanged. | Attach "direction required?" to every vector quantity. | Classify mass, weight, energy, momentum and displacement. | SPEC |

## 03. Motion graph gradient/area

| Tier | Typical error | Repair routine | Rapid retest | Evidence |
|---|---|---|---|---|
| Both | Students confuse gradient with area or use the wrong graph relationship. | Annotate axes first; write "gradient = Δy/Δx" and ask what its units become. | What does the gradient of a velocity-time graph represent? What does its area represent? | SPEC |

## 04. Resultant force and constant velocity

| Tier | Typical error | Repair routine | Rapid retest | Evidence |
|---|---|---|---|---|
| Both | Zero resultant force is described as zero speed. | Use Newton 1: zero resultant force means no acceleration, so velocity is constant (which may be zero). | Can an object move at 20 m/s with zero resultant force? Explain. | SPEC |

## 05. Mass vs weight

| Tier | Typical error | Repair routine | Rapid retest | Evidence |
|---|---|---|---|---|
| Both | Mass and weight are treated as the same quantity/unit. | Mass in kg; weight is a force in N and depends on g. | Find the weight of 2.5 kg at g=9.8 N/kg. | SPEC |

## 06. Momentum direction

| Tier | Typical error | Repair routine | Rapid retest | Evidence |
|---|---|---|---|---|
| Higher | Momentum is treated as unsigned in collisions. | Choose one direction positive before calculating; keep signs through conservation. | Two objects move in opposite directions: how should one velocity be represented? | SPEC |

## 07. Energy “lost”

| Tier | Typical error | Repair routine | Rapid retest | Evidence |
|---|---|---|---|---|
| Both | Responses say energy disappears. | Use “dissipated to thermal store of surroundings” and preserve conservation. | Rewrite “friction loses energy” scientifically. | SPEC |

## 08. Efficiency denominator

| Tier | Typical error | Repair routine | Rapid retest | Evidence |
|---|---|---|---|---|
| Both | Useful output is divided by wasted energy rather than total input. | Write useful/total before entering numbers; multiply by 100 only if a percentage is required. | A device gets 600 J and transfers 420 J usefully: efficiency? | SPEC |

## 09. Wavelength measurement

| Tier | Typical error | Repair routine | Rapid retest | Evidence |
|---|---|---|---|---|
| Both | Wavelength measured crest-to-trough or over a non-integer number of cycles. | Measure identical phase points; measure several wavelengths then divide. | Mark one wavelength on a wave sketch. | SPEC |

## 10. Refraction direction

| Tier | Typical error | Repair routine | Rapid retest | Evidence |
|---|---|---|---|---|
| Both | Students reverse toward/away from normal. | Slower medium -> toward normal; faster medium -> away, using normal not surface as reference. | Air to glass: toward or away from normal? | SPEC |

## 11. EM spectrum order

| Tier | Typical error | Repair routine | Rapid retest | Evidence |
|---|---|---|---|---|
| Both | Order, frequency and wavelength trends are mixed. | Learn one ordered chain and derive the inverse trend between frequency and wavelength. | Which has higher frequency: UV or infrared? | SPEC |

## 12. Half-life

| Tier | Typical error | Repair routine | Rapid retest | Evidence |
|---|---|---|---|---|
| Both | Half-life treated as time for all material to decay. | Use repeated halving of undecayed nuclei/activity; random decay never reaches exactly zero in the model. | Start at 800 counts/min: after 3 half-lives? | SPEC |

## 13. Contamination vs irradiation

| Tier | Typical error | Repair routine | Rapid retest | Evidence |
|---|---|---|---|---|
| Both | The two hazards are used as synonyms. | Contamination = radioactive material on/in object; irradiation = exposure to radiation source. | Which hazard may persist after source is removed? | SPEC |

## 14. Star life cycles

| Tier | Typical error | Repair routine | Rapid retest | Evidence |
|---|---|---|---|---|
| Both | Every star is given the same end-state. | Branch the life cycle by initial mass after red giant/supergiant stages. | Which route can lead to a neutron star or black hole? | SPEC |

## 15. Moment arm

| Tier | Typical error | Repair routine | Rapid retest | Evidence |
|---|---|---|---|---|
| Physics-only | Distance along a lever is used instead of perpendicular distance to force line. | Draw the line of action and mark perpendicular distance from pivot. | Where is the moment arm on an angled force diagram? | SPEC |

## 16. Current “used up”

| Tier | Typical error | Repair routine | Rapid retest | Evidence |
|---|---|---|---|---|
| Both | Current is said to decrease because components consume it in series. | Charge flow rate is the same around a single series loop; energy is transferred, not current consumed. | Compare current before and after a lamp in series. | SPEC |

## 17. Voltmeter/ammeter placement

| Tier | Typical error | Repair routine | Rapid retest | Evidence |
|---|---|---|---|---|
| Both | Meters are connected incorrectly. | Ammeter in series; voltmeter in parallel across the component. | Sketch meters around a resistor. | SPEC |

## 18. Filament lamp I-V

| Tier | Typical error | Repair routine | Rapid retest | Evidence |
|---|---|---|---|---|
| Both | Non-linearity is described without linking it to heating and resistance. | As current rises, filament temperature rises, resistance rises, so gradient behaviour changes. | Why is the lamp I-V graph curved? | SPEC/ER23P2H |

## 19. Static charging

| Tier | Typical error | Repair routine | Rapid retest | Evidence |
|---|---|---|---|---|
| Both | Protons are said to transfer between solids. | Electrons transfer; protons stay bound in nuclei. | If an object gains electrons, what sign is its charge? | SPEC |

## 20. Induction

| Tier | Typical error | Repair routine | Rapid retest | Evidence |
|---|---|---|---|---|
| Both | A stationary magnet in a stationary coil is assumed to induce continuously. | Induction requires a change in magnetic flux/field linking the conductor. | Name two ways to increase induced p.d. | SPEC |

## 21. Transformer ratio orientation

| Tier | Typical error | Repair routine | Rapid retest | Evidence |
|---|---|---|---|---|
| Physics-only | Primary and secondary quantities are inverted. | Write labels under every value before substituting Vp/Vs = Np/Ns. | If turns double from primary to secondary, what happens to voltage ideally? | SPEC |

## 22. Density units

| Tier | Typical error | Repair routine | Rapid retest | Evidence |
|---|---|---|---|---|
| Both | g/cm3 and kg/m3 values are mixed without conversion. | Keep mass-volume unit pairs consistent or convert to SI. | Convert 1 g/cm3 to kg/m3. | SPEC/ER23P2H |

## 23. SHC vs latent heat

| Tier | Typical error | Repair routine | Rapid retest | Evidence |
|---|---|---|---|---|
| Both | c and L are selected from keyword matching rather than process. | Temperature changing -> mcΔθ. State changing at constant temperature -> mL. | Melting ice at 0 °C: which relationship? | SPEC |

## 24. Change of state temperature

| Tier | Typical error | Repair routine | Rapid retest | Evidence |
|---|---|---|---|---|
| Both | Temperature is assumed to rise continuously while melting/boiling. | Transferred energy changes internal arrangement/potential energy during a pure-state transition, so temperature can plateau. | Why can heating continue while temperature stays constant? | SPEC |

## 25. Spring extension

| Tier | Typical error | Repair routine | Rapid retest | Evidence |
|---|---|---|---|---|
| Both | Total length is used in F=kx. | Extension = loaded length - original length. | Spring 12 cm becomes 17 cm: extension in metres? | SPEC |

## 26. Force-extension graph energy

| Tier | Typical error | Repair routine | Rapid retest | Evidence |
|---|---|---|---|---|
| Higher | Area/gradient is interpreted incorrectly. | With force on y and extension on x: gradient in linear region = k; area = elastic energy. | What physical quantity is the triangular area? | SPEC |

## 27. Practical variable language

| Tier | Typical error | Repair routine | Rapid retest | Evidence |
|---|---|---|---|---|
| Both | Answers say “keep everything the same”. | Name measurable controls explicitly and say how they are kept constant. | Give two controls for the thermal-radiation practical. | ER23P2H |

## 28. Precision vs accuracy

| Tier | Typical error | Repair routine | Rapid retest | Evidence |
|---|---|---|---|---|
| Both | Precision is used as a synonym for correctness. | Accuracy = closeness to true value; precision = spread/resolution of repeated measurements. | Can results be precise but inaccurate? Give an example. | SPEC |

## 29. Random vs systematic error

| Tier | Typical error | Repair routine | Rapid retest | Evidence |
|---|---|---|---|---|
| Both | Repeats are offered as a fix for systematic error. | Repeats/re-mean reduce random scatter; systematic bias needs calibration/design correction. | A zero error on a balance is which type? | SPEC |

## 30. Extended response structure

| Tier | Typical error | Repair routine | Rapid retest | Evidence |
|---|---|---|---|---|
| Both | Lists of facts do not form a causal argument. | Use point -> physics reason -> consequence -> evidence/judgement where required. | Turn three bullet facts into a linked explanation. | SPEC |

# Diagnostic log

| # | Error family | Status | Repair date | Retest evidence |
|---|---|---|---|---|
| 01 | Units before equations | Not secure / Repairing / Secure | Date: _____ | Retest: _____ |
| 02 | Scalar vs vector | Not secure / Repairing / Secure | Date: _____ | Retest: _____ |
| 03 | Motion graph gradient/area | Not secure / Repairing / Secure | Date: _____ | Retest: _____ |
| 04 | Resultant force and constant velocity | Not secure / Repairing / Secure | Date: _____ | Retest: _____ |
| 05 | Mass vs weight | Not secure / Repairing / Secure | Date: _____ | Retest: _____ |
| 06 | Momentum direction | Not secure / Repairing / Secure | Date: _____ | Retest: _____ |
| 07 | Energy “lost” | Not secure / Repairing / Secure | Date: _____ | Retest: _____ |
| 08 | Efficiency denominator | Not secure / Repairing / Secure | Date: _____ | Retest: _____ |
| 09 | Wavelength measurement | Not secure / Repairing / Secure | Date: _____ | Retest: _____ |
| 10 | Refraction direction | Not secure / Repairing / Secure | Date: _____ | Retest: _____ |
| 11 | EM spectrum order | Not secure / Repairing / Secure | Date: _____ | Retest: _____ |
| 12 | Half-life | Not secure / Repairing / Secure | Date: _____ | Retest: _____ |
| 13 | Contamination vs irradiation | Not secure / Repairing / Secure | Date: _____ | Retest: _____ |
| 14 | Star life cycles | Not secure / Repairing / Secure | Date: _____ | Retest: _____ |
| 15 | Moment arm | Not secure / Repairing / Secure | Date: _____ | Retest: _____ |
| 16 | Current “used up” | Not secure / Repairing / Secure | Date: _____ | Retest: _____ |
| 17 | Voltmeter/ammeter placement | Not secure / Repairing / Secure | Date: _____ | Retest: _____ |
| 18 | Filament lamp I-V | Not secure / Repairing / Secure | Date: _____ | Retest: _____ |
| 19 | Static charging | Not secure / Repairing / Secure | Date: _____ | Retest: _____ |
| 20 | Induction | Not secure / Repairing / Secure | Date: _____ | Retest: _____ |
| 21 | Transformer ratio orientation | Not secure / Repairing / Secure | Date: _____ | Retest: _____ |
| 22 | Density units | Not secure / Repairing / Secure | Date: _____ | Retest: _____ |
| 23 | SHC vs latent heat | Not secure / Repairing / Secure | Date: _____ | Retest: _____ |
| 24 | Change of state temperature | Not secure / Repairing / Secure | Date: _____ | Retest: _____ |
| 25 | Spring extension | Not secure / Repairing / Secure | Date: _____ | Retest: _____ |
| 26 | Force-extension graph energy | Not secure / Repairing / Secure | Date: _____ | Retest: _____ |
| 27 | Practical variable language | Not secure / Repairing / Secure | Date: _____ | Retest: _____ |
| 28 | Precision vs accuracy | Not secure / Repairing / Secure | Date: _____ | Retest: _____ |
| 29 | Random vs systematic error | Not secure / Repairing / Secure | Date: _____ | Retest: _____ |
| 30 | Extended response structure | Not secure / Repairing / Secure | Date: _____ | Retest: _____ |

# 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

**[ER23P2H] Pearson Edexcel GCSE Physics 1PH0/2H Examiners Report, June 2023**
https://qualifications.pearson.com/content/dam/pdf/GCSE/Science/2016/exam-materials/1ph0-2h-pef-20230824.pdf

**[ER23P1F] Pearson Edexcel GCSE Physics 1PH0/1F Examiners Report, June 2023**
https://qualifications.pearson.com/content/dam/pdf/GCSE/Science/2016/exam-materials/1ph0-1f-pef-20230824.pdf

**[ER24P1H] Pearson Edexcel GCSE Physics 1PH0/1H Examiners Report, June 2024**
https://qualifications.pearson.com/content/dam/pdf/GCSE/Science/2016/Exam-materials/1ph0-1h-pef-20240822.pdf

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