Meet The Required Practicals

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What Are Required Practicals?

- In AQA GCSE Combined Science, you're expected to carry out, understand and apply knowledge from 8 required practicals for Physics.
- Practical questions are worth c. 10-15% of the total marks across the papers.
- They test your ability to:
  - Describe methods
  - Analyse data
  - Apply understanding
  - Evaluate and improve experiments

Practicals are not just about doing science, they're about thinking like a scientist!

	Practical	What You Investigate	Key Skills and Knowledge
1	Specific Heat Capacity	Measuring the specific heat capacity of materials (e.g. copper, aluminium)	- Measuring temp., mass, voltage, current - Calculating energy and plotting graphs - Interpreting gradient to find SHC
2	Resistance	Investigating resistance in wires and in series vs parallel circuits	- Using ammeters and voltmeters - Constructing and interpreting circuits - Applying R=V/I
3	I-V Characteristics	Investigating how current and voltage relate for a resistor, lamp and diode	- Setting up component-specific circuits - Measuring I and V, plotting curves - Understanding non-linear resistance
4	Density	Determining density of solids and liquids using mass and volume	- Using rulers, balances, displacement - Calculating density in g/cm^3 and kg/m^3 - Applying practical measurement skills
5	Force and Extension	Exploring Hooke's Law for springs	- Measuring spring extension under force - Plotting force-extension graphs - Calculating spring constant
6	Acceleration	Effect of force or mass on acceleration of a trolley	- Applying Newton's 2nd Law- Timing motion and calculating $a=\Delta v/t$ - Planning fair tests and controlling variables
7	Waves	Measuring wavelength, frequency, and speed in solids and liquids	- Using ripple tanks and vibrating strings - Calculating wave speed: $v=f\lambda$ - Observing standing waves and patterns
8	Radiation & Absorption	Infrared emission and absorption by different surfaces	- Comparing radiation with a Leslie cube - Controlling variables (distance, temp.) - Drawing conclusions about surface types

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Typical Exam Question Types

Question Type	What It Tests	Example
Describe a method	Can you explain the steps and apparatus clearly?	"Describe how you would measure the specific heat capacity of aluminium."
Identify variables	Can you name and explain IV, DV, CV?	"What is the independent variable in the resistance practical?"
Explain results	Can you use physics knowledge to explain patterns?	"Why does current stop increasing in a diode when the potential difference is reversed?"
Suggest improvements	Can you spot weaknesses and propose improvements?	"Suggest how to improve the method used by the student."
Use data / Calculations	Can you use formulae, plot graphs, and calculate?	"Calculate the density of a metal cube using its mass and volume."
Evaluate	Can you judge accuracy, reliability, and uncertainty?	"Evaluate the method used to determine the spring constant."
Predict	Can you forecast outcomes based on known relationships?	"Predict how doubling the force will affect the extension of a spring."
Apply to unfamiliar context	Can you transfer ideas to a new setup?	"How could you measure wave speed using a guitar string instead of a ripple tank?"

Top Tips for Applying Required Practicals to Exams

- Understand the purpose of each practical. What is it teaching you?
- Know the variables:
  - Independent = what you change
  - Dependent = what you measure
  - Control = what stays the same
- Be clear on method steps, but don't just memorise it – understand why each step is done.
- Be confident in data skills, such as:
  - Calculating means and percentage changes
  - Identifying anomalies
  - Drawing and interpreting graphs
- Be prepared to evaluate – what went wrong? How could you improve it?
- Be ready for unfamiliar practicals:
  - In the exam, you might see a practical using different equipment, different variables, or measuring something slightly different – but the scientific principles remain the same.
- Include risk assessment points: what are the hazards and how are they managed?
- Use precise scientific language:
  - e.g. reliable, valid, resolution, systematic error, uncertainty, frequency, spring constant, specific heat capacity, refraction