

Exam technique

How the exams work, technique for every type of question, and every command word

How the exams work

Six written papers, all sat at the end of the course: two in biology, two in chemistry and two in physics, each 1 h 15 min and 70 marks and each worth the same (16.7%). Your grade comes from your total over all six papers (420 marks) and is a double grade, from 9-9 down to 1-1, with the two numbers either the same or one apart (for example 7-7 or 7-6). On the Higher tier you can get 9-9 down to 4-4, with an allowed 4-3. Papers mix multiple choice, short answers, calculations, data questions and longer open-response answers, and any paper can ask about its required practicals.

Paper	Time	Marks	Calculator	What's on it
Biology Paper 1	1 h 15 min	70	Allowed	Cell biology (4.1), Organisation (4.2), Infection and response (4.3) and Bioenergetics (4.4). Required practicals: microscopy, osmosis, food tests, the effect of pH on amylase, and light intensity and photosynthesis.
Biology Paper 2	1 h 15 min	70	Allowed	Homeostasis and response (4.5), Inheritance, variation and evolution (4.6) and Ecology (4.7). Required practicals: reaction time, and the field investigation with quadrats and transects.
Chemistry Paper 1	1 h 15 min	70	Allowed	Atomic structure and the periodic table (5.1), Bonding, structure, and the properties of matter (5.2), Quantitative chemistry (5.3), Chemical changes (5.4) and Energy changes (5.5). Required practicals: making a soluble salt, electrolysis, and temperature changes. A periodic table is provided.
Chemistry Paper 2	1 h 15 min	70	Allowed	The rate and extent of chemical change (5.6), Organic chemistry (5.7), Chemical analysis (5.8), Chemistry of the atmosphere (5.9) and Using resources (5.10); questions can also draw on the basic ideas of 5.1 to 5.3. Required practicals: rates of reaction, chromatography, and water purification. A periodic table is provided.
Physics Paper 1	1 h 15 min	70	Allowed	Energy (6.1), Electricity (6.2), Particle model of matter (6.3) and Atomic structure (6.4). Required practicals: specific heat capacity, resistance, I–V characteristics, and density. The Physics Equations Sheet is provided.
Physics Paper 2	1 h 15 min	70	Allowed	Forces (6.5), Waves (6.6) and Magnetism and electromagnetism (6.7); questions can also use the energy ideas from 6.1 and 6.2. Required practicals: force and extension, acceleration, waves, and infrared radiation from different surfaces. The Physics Equations Sheet is provided.

Exam technique

Preparing in the weeks before

- Revise paper by paper. Each of the six papers tests its own topics (see the table above), although Chemistry Paper 2 can also use ideas from 5.1 to 5.3 and Physics Paper 2 can use energy ideas from 6.1 and 6.2, so build your timetable around them and use the days between exams to revise the topics of the next paper.
- Your grade comes from your total over all 420 marks, so a mark is worth the same wherever you earn it. A strong physics paper can make up for a weaker biology one, but no paper can be written off.
- Learn all 21 required practicals as a set. For each one, know the aim, the method, the equipment, the independent, dependent and control variables, one hazard and how to control it, and the table and graph you would draw.
- Learn the physics equations until you can write each one, its units and its rearranged forms in seconds. You get the Physics Equations Sheet, but it doesn't tell you which equation a question needs, and looking things up costs time.
- Find every point marked **HT only** in the specification. These appear only on Higher papers and carry many of the harder marks: moles and limiting reactants, bond energies, half equations, strong and weak acids, how changing conditions shifts an equilibrium, glucagon and negative feedback, how limiting factors interact in photosynthesis, momentum, resolving forces, and Fleming's left-hand rule.
- Revise by testing yourself, not by rereading. Answer questions, use flashcards, and write out processes from memory (the reflex arc, the carbon cycle, what forms at each electrode), then check them against your notes.
- In the last six to eight weeks, sit full 70-mark papers against the clock. Keep at least one real AQA paper per science unseen until close to the exam, as a true rehearsal.
- Keep a mistakes list for each science: the question, what you wrote and what would have earned the mark. Read it before every paper.

The night before and the morning of the exam

- Check which paper it is (for example Chemistry Paper 2), which topics it covers, and whether it is a morning or afternoon session.
- Keep the review light: that paper's cheatsheets, your mistakes list and a quick run through key facts such as the gas tests, the circuit rules or the functions of the organelles. Don't start new topics.
- Pack several black pens, a pencil, a rubber, a sharpener, a 30 cm ruler, a protractor and the scientific calculator you always use, with a working battery. Graphs and diagrams are drawn in pencil.
- Sleep is worth more than a late night of cramming. Most marks on these papers depend on clear recall and careful reading, and both suffer when you are tired.
- Eat breakfast, take water and arrive early. Five minutes of quick self-quizzing on the way in warms up your memory.
- If two science papers fall close together, don't dwell on the first one. The next paper tests different topics, so put your energy there.

The first five minutes

- Fill in the front cover, then flick through the whole booklet. Note where the extended answers are (often worth 6 marks and marked in levels) and where the long calculations are.
- Physics papers: glance at the equations sheet so you know where each equation sits. Chemistry papers: find the periodic table; it gives the relative atomic masses you need for relative formula mass.
- Start at question 1. The early questions are usually the most accessible and settle your nerves. Difficulty tends to rise through the paper, but a hard part can turn up anywhere, so don't panic when one does.
- If you are worried about forgetting something (an equation, a mnemonic, the order of the reactivity series), jot it down now in a blank space inside the page border.
- Read the instructions on the cover once: answer every question in the space provided, show clearly how you work out calculations, and cross through any work you don't want marked.

Timing

- You have 75 minutes for 70 marks. Aim for a mark a minute, which leaves about 5 minutes to check.
- Use checkpoints: roughly 25 marks done after 25 minutes and 50 marks after 50 minutes. Count the marks shown after each part, not question numbers, because questions vary in length.
- Bank time on the quick questions. Tick-box and one-word answers take well under a minute each, and that buys time for multi-step calculations and extended answers.
- Give a 6-mark question about 6 to 7 minutes: one minute to plan, the rest to write. Don't leave it until the last two minutes.
- If a part has taken twice its marks in minutes and you are still stuck, write what you can, star it and move on. Come back to it at the end.
- Physics papers have more multi-step calculations and often feel tighter on time; biology papers have more reading and writing. Sit timed papers in all three sciences so you know your own pace in each.
- Don't write essays for 1- and 2-mark questions. The marks and the number of answer lines show how much is needed.

Reading the question

- Underline the command word and decide what it wants: describe (what happens), explain (why it happens), compare (both things, side by side), evaluate (both sides and a judgement).
- The marks tell you how many separate points to make. A 3-mark explain needs three distinct points, linked together.
- Watch the words printed in bold, such as **one**, **two** and Tick (✓) **one** box. Give exactly the number asked for: when you give more answers than asked, a wrong extra answer can cancel a right one.
- 'Use Figure 2' or 'Use data from Table 1' means your answer must quote values from it. General knowledge on its own scores little or nothing.
- Look for limits on what counts: 'in terms of particles', 'in terms of electrons', 'other than temperature', 'give a reason for your answer'. An answer outside the limit earns nothing.
- Reread the introduction and the earlier parts before answering a later part. The context, the data or a value you worked out earlier often feeds into it.
- An unfamiliar context is still testing a specification idea: a disease you've never heard of is still about how pathogens spread, a new alloy is still about metallic bonding, a new vehicle is still about forces and energy. Ask yourself which topic the question really belongs to.

Multiple choice and short answers

- Tick (✓) one box means exactly one. Two ticks score zero even if one of them is right. To change your answer, cross out the unwanted tick completely and tick the new box.
- Work by elimination: rule out the options that are clearly wrong, then test the last two against the exact wording of the question.
- When you complete sentences from a box of words, a word may be used once, more than once or not at all. Don't assume every word is used once.
- Give, name and write want a word, a phrase or one sentence. Don't pad: one precise term beats a long explanation.
- Use the specification's own terms: partially permeable membrane, resultant force, potential difference, intermolecular forces, dissipated. Vague words such as 'it', 'stuff' or 'the energy is lost' don't score.
- Misspelt scientific words are usually accepted when the meaning is clear, but not when the word could be mistaken for another term: mitosis and meiosis, glucose, glycogen and glucagon, chlorine and chloride. Learn to spell those exactly.
- Answer in the form asked for: if the question asks for a name, write the name; if it asks for a formula, write the formula.

Calculations and method marks

- The cover tells you to show clearly how you work out your answer. A correct final answer usually earns all the marks, but a wrong answer with no working earns nothing, while a wrong answer with a correct method can still earn some of them.
- Set out every calculation the same way: equation, numbers substituted (units converted first), answer with unit. For example, $\Delta E = m c \Delta \theta = 2.0 \times 900 \times 15 = 27\,000 \text{ J}$.
- Convert before you substitute: g to kg, cm to m, kJ to J, minutes to seconds, mA to A. The physics equations work in SI units.
- Rearrange in symbols first if it helps: $R = V \div I$ from $V = IR$, or $v = \sqrt{(2E_k \div m)}$ from $E_k = \frac{1}{2}mv^2$.
- In a calculation with several parts, use your unrounded answer from the earlier part. If that earlier answer was wrong, still use it: a correct method in the later part can still earn its marks (error carried forward).
- Biology calculations to practise: magnification, percentage change in mass, means, rates (such as $1 \div \text{time}$), surface area to volume ratio, and population estimates from quadrats.
- Chemistry calculations: relative formula mass, mass changes when a gas is given off or taken in, concentration in g/dm^3 , R_f values and mean rate of reaction; on the Higher tier also moles, reacting masses, limiting reactants and bond energies.
- Physics calculations: energy in each store, work done, power, efficiency, specific heat capacity, specific latent heat, charge, resistance, electrical power and energy, density, weight, speed, acceleration, force, spring constant, momentum and wave speed.
- Sense-check every answer. A person with a mass of 6000 kg, a car moving at 400 m/s or an efficiency greater than 1 means a slip somewhere.
- Show that questions give you the answer. Set out the full working and give your final value to one more significant figure than the value quoted, so the examiner can see you calculated it.

Units, significant figures and your calculator

- Always give a unit unless it is printed on the answer line. Units in this course include J, W, N, m/s, m/s², kg/m³, Ω , V, A, C, Hz, J/kg °C, J/kg, N/m, kg m/s, g/dm³ and cm³/s.
- If the question asks for a number of significant figures or decimal places, give exactly that. Otherwise match the data in the question, usually 2 or 3 significant figures.
- Never round partway through. Keep the full value on your calculator (use the ANS key or the memory) and round only the final answer.
- Know the prefixes: micro (μ) = 10^{-6} , milli (m) = 10^{-3} , kilo (k) = 10^3 , mega (M) = 10^6 . Enter standard form with the $\times 10^x$ key rather than typing $\times 10^x$.
- Use brackets for anything on top of a fraction: (final mass – initial mass) $\div$ initial mass $\times$ 100 for percentage change. In $\frac{1}{2}mv^2$, square only the speed.
- Unit conversions for area and volume catch people out: 1 m = 100 cm, but 1 m³ = 1 000 000 cm³, and 1 dm³ = 1000 cm³. In microscopy, 1 mm = 1000 μ m.
- For a mean, add the values and divide by how many there are, leaving out any anomalous result, and give it to the same resolution as the data.
- Practise on the calculator you will use in the exam: squares and square roots, standard form, fractions, the ANS key, and how to clear it.

Graphs, tables and data

- Read the axis labels, units and scale before you read off any value. Work out what one small square is worth.
- When you read a value from a graph, draw the lines on it in pencil. They show your method and help you avoid misreading.
- To describe a trend, give the direction, any change in shape and some numbers: 'The rate increases as the temperature rises to 40 °C, then falls to zero by 60 °C.'
- Gradient = change in y $\div$ change in x, found from a large triangle. On the Higher tier you find the gradient of a curve by drawing a tangent at that point, for example to find a rate of reaction at a given time.
- On a distance–time graph the gradient is the speed; on a velocity–time graph the gradient is the acceleration, and on the Higher tier the area under the line is the distance travelled.
- Anomalous results don't fit the pattern. Leave them out of means and lines of best fit, and suggest a specific cause if you are asked.
- Conclusions must come from the data and go no further. A correlation does not prove that one factor causes the other, and a small sample or a narrow range limits what you can claim.
- When you compare two sets of data, quote a value from each and say which is higher, and by how much if you can.
- In tables, check the column headings: are the numbers totals, means or rates, and in what units?

Drawing graphs and diagrams

- Use a sharp pencil and a ruler, so you can correct mistakes cleanly.
- Put the independent variable on the x-axis and the dependent variable on the y-axis. Label both with the quantity and its unit, and choose an even scale that uses more than half the grid.
- Plot points as small, neat crosses, accurate to within half a small square.
- A line of best fit is a single straight line drawn with a ruler, or a smooth curve, with the points spread evenly either side, ignoring anomalies. Never join dot to dot.
- Use a bar chart when the independent variable is categoric (such as type of surface) and a line graph when both variables are continuous (such as temperature and rate).
- Circuit diagrams need the standard symbols: cell, battery, switch, resistor, variable resistor, lamp, fuse, diode, LED, LDR, thermistor, ammeter and voltmeter. Ammeters go in series; voltmeters go in parallel across the component.
- Other diagrams you may have to draw or complete: dot and cross diagrams, reaction profiles for exothermic and endothermic reactions, magnetic field lines from north to south, a wave with its amplitude and wavelength labelled, force arrows drawn to scale, a ray diagram for refraction, a Punnett square, and a food chain with arrows in the direction of energy transfer.
- Draw label lines with a ruler, touching exactly the part you are naming.

Writing equations: chemical, biological and nuclear

- Balance a symbol equation by changing only the numbers in front of formulae, never the small numbers inside a formula. When you finish, count every type of atom on each side.
- Remember which elements exist as molecules of two atoms: H_2 , N_2 , O_2 , F_2 , Cl_2 , Br_2 and I_2 .
- Work out the formula of an ionic compound from the charges on its ions, so the compound is neutral overall: Mg^{2+} and Cl^- give MgCl_2 . Know the common ions: OH^- , SO_4^{2-} , NO_3^- , CO_3^{2-} and NH_4^+ .
- Add state symbols, (s), (l), (g) and (aq), whenever the question asks for them.
- Higher tier: write half equations for what happens at each electrode, such as $2\text{Cl}^- \rightarrow \text{Cl}_2 + 2\text{e}^-$ and $\text{Cu}^{2+} + 2\text{e}^- \rightarrow \text{Cu}$, and ionic equations such as $\text{H}^+ + \text{OH}^- \rightarrow \text{H}_2\text{O}$. The charges must balance as well as the atoms. Oxidation is loss of electrons; reduction is gain.
- Biology: know the word equations for photosynthesis, aerobic respiration, and anaerobic respiration in muscles and in yeast, and recognise the formulae CO_2 , H_2O , O_2 and $\text{C}_6\text{H}_{12}\text{O}_6$ in the balanced equation for photosynthesis.
- Physics: in a nuclear equation the mass numbers (top) and the atomic numbers (bottom) must balance on both sides. Alpha decay lowers the mass number by 4 and the atomic number by 2; beta decay raises the atomic number by 1 and leaves the mass number unchanged.

Six-mark (extended response) answers

- Papers usually include at least one extended answer, often worth 6 marks. These are marked by level, not by counting points: the examiner reads the whole answer, decides which level it reaches, then gives a mark within that level.
- Top level (5 to 6 marks): a detailed answer that covers the whole question, with the ideas linked in a logical order. Middle level (3 to 4): several relevant points with some linking. Bottom level (1 to 2): a few simple, relevant statements.
- Plan for about a minute. Jot down 5 to 7 key points in a blank space, number them in a sensible order, then write in full sentences.
- Describing a method (often a required practical): numbered steps with the equipment named and sized, what you change and by how much, what you measure and how, the control variables, repeats, how you would process the results, and a safety point.
- Explaining a process (how blood glucose is controlled, why the rate rises with concentration, how an electromagnet works): write it as a chain, joining each step to the next with 'so', 'because' or 'which means'.
- Comparing or evaluating (energy resources, mitosis and meiosis, treatments for a disease): cover both sides, use any data you are given, and finish with a conclusion that follows from what you wrote.
- Stay on the question. Correct science that doesn't answer it earns nothing, and a statement that is wrong or contradicts another can keep the answer out of the top level.
- Use the answer lines as a guide to length. If you run over, carry on in the extra pages at the back and say so in the original space.

Required practicals and working scientifically

- Name variables precisely: 'the concentration of the hydrochloric acid', not 'the acid'; 'the volume of oxygen collected in 5 minutes', not 'the bubbles'.
- Independent variable: what you change. Dependent variable: what you measure. Control variables: what you keep the same, and why each must stay the same.
- Repeatable: the same person, using the same method and equipment, gets similar results. Reproducible: someone else, or a different method or piece of equipment, gets similar results.
- Accurate: close to the true value. Precise: repeat readings close together. Resolution: the smallest change an instrument can show.
- Random errors scatter repeat readings, so repeat and take a mean. Systematic errors shift every reading the same way, as with a balance that wasn't zeroed.
- Improvements must be specific: 'use a gas syringe instead of counting bubbles', 'use a water bath to keep the temperature constant', 'take more readings close to the peak'. 'Be more careful' scores nothing.
- A hazard needs the risk and a control: 'hot water can scald, so handle the beaker with tongs and keep it away from the edge of the bench'.
- Know how each practical's results are processed: percentage change in mass (osmosis), $\text{resistance} = V \div I$, spring constant from force and extension, R_f values, mean rate of reaction, specific heat capacity from the energy supplied and the temperature rise.
- Know the expected graph shapes: a straight line through the origin for a resistor at constant temperature, an S-shaped curve for a filament lamp, current in one direction only for a diode, and a peak at the optimum pH for amylase.
- Questions often set a practical in a new context or with different equipment. Apply the same principles: a fair test, suitable measuring instruments, and a sensible range and interval of values.

Checking your paper

- Turn every page and make sure you haven't missed a question, especially one that continues overleaf.
- Redo each calculation on your calculator from scratch rather than just reading it through. Check the units, conversions and significant figures, and whether the size of the answer makes sense.
- Check that each answer does what the question asked: a name where it said name, both things where it said compare, a reason where it said explain.
- Check that every tick-box question has exactly one tick, and that your graphs have labelled axes and correctly plotted points.
- Fill any gap with your best attempt. You lose nothing for a wrong answer, and a blank always scores zero.

When you are stuck, extra space and crossing out

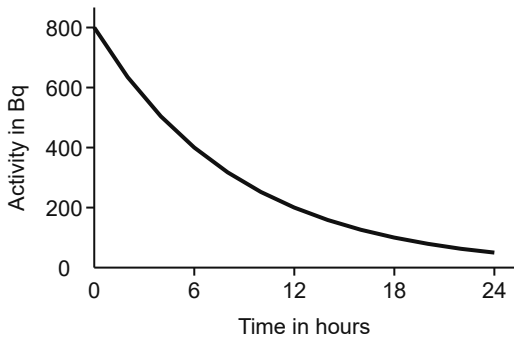
- Stuck on a calculation? Write down the equation you would use and substitute the numbers you have. That can earn a mark even if you can't finish.
- Stuck on a written answer? Write the relevant key terms and facts you know, in sentences that connect to the question. Partial answers earn partial marks.
- Don't sit on one part for more than a couple of minutes. Star it, move on and come back later; another question may remind you of the idea.
- If you need more space, use the extra lined pages at the end of the booklet. Write the question number (for example 04.3) beside the extra answer, and write 'continued on extra page' in the original space.
- Cross out work you don't want marked with a single neat line. If you leave two different answers uncrossed, you may not get the mark, so make it clear which one counts.
- Keep your writing inside the border of each page. Scripts are scanned for marking, and anything written outside the answer areas may not be seen.

Learning from mocks

- Mark strictly with the mark scheme. Give yourself a mark only when your answer matches a marking point, not when you meant it.
- Sort every lost mark by cause: didn't know it, misread the question, slipped in a calculation, or ran out of time. Each needs a different fix.
- Didn't know it: revise that subtopic from your notes, then test it again with a short set of questions within a few days.
- Misread it: underline the command word and the bold words in your next paper, and reread the question before you move on.
- Calculation slips: build a checking routine (units, conversions, re-entering the numbers) and use it every time.
- Timing: note where you were at 25 and 50 minutes, and adjust your pace in the next mock.
- Rewrite your weakest extended answer using the mark scheme's content until it would reach the top level.
- Look for patterns across all six papers. If you drop marks on practical or data questions in every science, that is a skill to practise, not a topic to reread.
- Redo the questions you got wrong a week later, without looking at your first attempt.

Command words

Word	What it means	How to answer	Example								
Balance	Add numbers in front of formulae so that each type of atom appears the same number of times on both sides of an equation.	Change only the numbers in front, never the subscripts. Count each type of atom on both sides at the end; on the Higher tier, check that charges balance in half equations too.	Balance: $__\text{Na} + \text{Cl}_2 \rightarrow __\text{NaCl}$. Answer: $2\text{Na} + \text{Cl}_2 \rightarrow 2\text{NaCl}$.								
Calculate	Work out a numerical answer from the numbers you are given.	Write the equation, substitute the values (units converted first), and give the answer with its unit, to the precision asked. Show your working so a slip still earns method marks.	A 1200 W kettle is switched on for 150 s. Calculate the energy transferred. $E = P t = 1200 \times 150 = 180\,000 \text{ J}$.								
Choose	Select the right answer or answers from the options given: a list, a box of words, or a set of statements.	Read every option before you choose. Use exactly as many as asked; for 'Tick one box', tick one only.	In which part of a cell does aerobic respiration take place? Tick one box: nucleus, mitochondria, ribosome, cell membrane. Answer: mitochondria.								
Compare	Say how two or more things are similar and how they are different.	Write about both things in every point, using words such as both, whereas, more, faster and higher. Quote figures from each if data is given.	Compare a bacterial cell with an animal cell. Both have a cell membrane, cytoplasm and ribosomes; the bacterial cell also has a cell wall, has no nucleus (its DNA is a single loop, and it may also have plasmids) and is much smaller.								
Complete / Label	Complete: fill in the gaps in a sentence, table, diagram or equation. Label: add the names of parts to a diagram.	Use words from the box if one is given. Draw label lines with a ruler so they touch exactly the part you are naming.	Complete the table to show the relative charges of the particles in an atom. <table><tr><th>Particle</th><th>Relative charge</th></tr><tr><td>Proton</td><td>_____</td></tr><tr><td>Neutron</td><td>_____</td></tr><tr><td>Electron</td><td>_____</td></tr></table> Answer: proton +1; neutron 0; electron -1.	Particle	Relative charge	Proton	_____	Neutron	_____	Electron	_____
Particle	Relative charge										
Proton	_____										
Neutron	_____										
Electron	_____										

Word	What it means	How to answer	Example
Define	Give the exact meaning of a scientific term.	One precise sentence that uses the specification's meaning. Learn key definitions until you can write them exactly.	Define isotopes. Atoms of the same element with the same number of protons but different numbers of neutrons.
Describe	Say what happens or what something is like, accurately and in order. You don't need to give reasons.	Give the facts or steps in a logical order. For a graph, give the trend and quote values. Don't explain unless the question also asks you to.	Describe how a reflex happens when you touch a hot plate. A receptor detects the stimulus; an impulse passes along a sensory neurone to a relay neurone in the spinal cord, then along a motor neurone to a muscle, which contracts.
Design / Plan	Set out how an investigation would be carried out; plan means write the method.	Numbered steps: equipment with sizes, what you change and over what range, what you measure and with what, the control variables, repeats, how you process the results, and a safety point.	Plan how to find how the length of a wire affects its resistance. Measure the current and potential difference for lengths from 10 cm to 100 cm in 10 cm steps; keep the current low so the wire doesn't heat up; repeat each length, find means, and calculate $R = V \div I$.
Determine	Use the data or information given to find an answer, often by reading from a graph or table.	Show what you read off (draw the lines on the graph) and any calculation you did with it.	Determine the half-life of the sample from the graph.  Answer: the activity falls from 800 Bq to 400 Bq in 6 hours (draw lines on the graph to show the readings), so the half-life is 6 hours.
Draw / Plot / Sketch	Draw: produce or add to a diagram. Plot: mark data points accurately on a grid. Sketch: show the general shape,	Use a pencil and ruler. Plot points to within half a small square. For a sketch, label the axes and show the key features, such as	Sketch the I–V characteristic of a filament lamp. An S-shaped line through the origin that gets less steep as the current increases in either direction.

Word	What it means	How to answer	Example										
	without exact values.	passing through the origin or levelling off.											
Estimate	Give an approximate value, using rounded figures or a sensible assumption.	Show the working and any assumption you made. Round to sensible figures; don't give a falsely precise answer.	A field measures 20 m by 30 m. Quadrats of 1 m ² contain a mean of 4 daisies. Estimate the number of daisies in the field. 4 × 600 = 2400 daisies.										
Evaluate	Weigh up the evidence for and against, using the information given and your own knowledge, and reach a judgement.	Give strengths and weaknesses (or advantages and disadvantages), quote the data, and end with a conclusion that follows from your points.	Evaluate replacing a gas-fired power station with wind turbines. For: renewable, and no carbon dioxide is released while generating. Against: output depends on the wind, so back-up is needed, and many turbines are needed. Judgement: good for cutting emissions if another supply covers calm days.										
Explain	Give the reasons why or how something happens, using scientific ideas.	Link each cause to its effect with because, so or which means. Each link is usually one marking point.	Explain why raising the temperature increases the rate of a reaction. The particles move faster, so they collide more often, and a greater proportion of collisions have at least the activation energy, so there are more successful collisions per second.										
Give / Name / Identify / Write	A short answer: a word, a phrase, a number or one sentence. Identify can also mean picking something out from information given.	Don't explain. Give exactly the number of answers asked for, because extra wrong answers can cancel right ones.	Name the gas that turns limewater milky. Carbon dioxide.										
Justify	Support an answer or a choice with evidence, usually from the information given.	State your answer, then back it up with specific figures or facts from the question.	A student added four metals to the same acid and measured the temperature rise. <table><tr><th>Metal</th><th>Temperature rise in °C</th></tr><tr><td>Copper</td><td>0</td></tr><tr><td>Iron</td><td>4</td></tr><tr><td>Magnesium</td><td>15</td></tr><tr><td>Zinc</td><td>8</td></tr></table> Which metal is the most reactive? Justify your answer using the table. Answer: magnesium, because it gave the largest temperature rise (15 °C) when added to the acid.	Metal	Temperature rise in °C	Copper	0	Iron	4	Magnesium	15	Zinc	8
Metal	Temperature rise in °C												
Copper	0												
Iron	4												
Magnesium	15												
Zinc	8												

Word	What it means	How to answer	Example												
Measure	Find a value accurately using an instrument, usually a ruler or protractor on the paper itself.	Measure carefully, in the unit asked for, to the resolution of the instrument. Measure between the right points (crest to crest, edge to edge).	In the exam you might measure the image of a cell on the paper with a ruler, edge to edge. Suppose it measures 24 mm and the real cell is 40 μm wide. Calculate the magnification. Answer: 40 μm = 0.040 mm, so magnification = 24 ÷ 0.040 = ×600.												
Predict	Say what is likely to happen, based on a pattern in the data or on scientific ideas.	Give a clear outcome (a direction or a value). Add a reason if there are marks for one.	Predict how potassium reacts with water compared with sodium. More vigorously, because reactivity increases down Group 1.												
Show that	Prove that a value you are given is correct, by working it out.	Write every step, starting from the equation. Give your answer to more significant figures than the value quoted; just writing the given value earns nothing.	Show that the resistance of the lamp is about 12 Ω when the potential difference is 6.0 V and the current is 0.52 A. $R = V \div I = 6.0 \div 0.52 = 11.5 \Omega$.												
Suggest	Apply what you know to a new or unfamiliar situation. More than one answer may be accepted.	Work out which specification idea the context is about, then give a plausible reason that uses it.	Suggest why a cactus has spines instead of broad leaves. A smaller surface area, so less water is lost by transpiration.												
Use	Base your answer on the information given. Sometimes you add your own knowledge too.	Quote the figures or facts from the figure, table or text. An answer from memory alone may score nothing.	The table shows the rate of an enzyme reaction at different pH values. <table><tr><td>pH</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td></tr><tr><td>Rate in arbitrary units</td><td>2</td><td>5</td><td>9</td><td>6</td><td>1</td></tr></table> Use the table to give the optimum pH of the enzyme. Answer: pH 7, where the rate of reaction is highest.	pH	5	6	7	8	9	Rate in arbitrary units	2	5	9	6	1
pH	5	6	7	8	9										
Rate in arbitrary units	2	5	9	6	1										

Free notes, worksheets, practice papers and mock exams at chhetriacademy.com. Written for this site; not taken from past papers.
 Stuck? 1-to-1 tutoring with a free 30-minute trial lesson.