

GCSE Examiners' Report

Applied Science (Single Award)
GCSE
Summer 2025

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Introduction

Our Principal examiners' report provides valuable feedback on the recent assessment series. It has been written by our Principal Examiners and Principal Moderators after the completion of marking and moderation, and details how candidates have performed in each unit.

This report opens with a summary of candidates' performance, including the assessment objectives/skills/topics/themes being tested, and highlights the characteristics of successful performance and where performance could be improved. It then looks in detail at each unit, pinpointing aspects that proved challenging to some candidates and suggesting some reasons as to why that might be.¹

The information found in this report provides valuable insight for practitioners to support their teaching and learning activity. We would also encourage practitioners to share this document – in its entirety or in part – with their learners to help with exam preparation, to understand how to avoid pitfalls and to add to their revision toolbox.

Further support

Document	Description	Link
Professional Learning / CPD	WJEC offers an extensive programme of online and face-to-face Professional Learning events. Access interactive feedback, review example candidate responses, gain practical ideas for the classroom and put questions to our dedicated team by registering for one of our events here.	https://www.wjec.co.uk/home/professional-learning/
Past papers	Access the bank of past papers for this qualification, including the most recent assessments. Please note that we do not make past papers available on the public website until 12 months after the examination.	Portal by WJEC or on the WJEC subject page
Grade boundary information	Grade boundaries are the minimum number of marks needed to achieve each grade. For unitised specifications grade boundaries are expressed on a Uniform Mark Scale (UMS). UMS grade boundaries remain the same every year as the range of UMS mark percentages allocated to a particular grade does not change. UMS grade boundaries are published at overall subject and unit level. For linear specifications, a single grade is awarded for the subject, rather than for each unit that contributes towards the overall grade. Grade boundaries are published on results day.	For unitised specifications click here: Results, Grade Boundaries and PRS (wjec.co.uk)

¹ Please note that where overall performance on a question/question part was considered good, with no particular areas to highlight, these questions have not been included in the report.

Exam Results Analysis	WJEC provides information to examination centres via the WJEC Portal. This is restricted to centre staff only. Access is granted to centre staff by the Examinations Officer at the centre.	Portal by WJEC
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Bank of Professional Learning materials	Access our bank of Professional Learning materials from previous events from our secure website and additional pre-recorded materials available in the public domain.	Portal by WJEC or on the WJEC subject page.
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Executive Summary

Total entries were similar to 2024, with the vast majority of candidates entered at foundation tier. There was a very small higher tier entry, but this was slightly higher than in 2024.

The objective style question parts at the beginning of the foundation tier question papers were generally well attempted again. This style of questioning which includes underlining answers, selection of answers from a list, scaffolding of calculations etc. made the first 25% of papers more accessible to candidates.

In all exam units, many candidates lacked the basic knowledge and understanding of the topics which meant that performance in recall questions was poor. Where candidates demonstrated some knowledge and understanding, many answers were vague or confused and sometimes did not relate exactly to the question asked.

Questions where candidates were asked to analyse data were variable. Candidates often struggled to include data, where necessary, in their responses. Candidates often didn't read the whole question e.g. adding/drawing a circuit diagram was often missed. Questions that assessed mathematical skills were also variable. At foundation tier, equations are given in the appropriate form in the question part. However, many candidates substituted incorrectly into given equations. Candidates often didn't consider units and subtractions and rounding errors were often seen. Graph work was inconsistent. Many candidates were unable to produce a linear scale from tabulated data. Candidates often failed to show their workings in calculations, potentially resulting in many lost marks.

QER questions requiring recall of knowledge were answered poorly, e.g. describing the structure and function of blood vessels. Candidates usually could not expand on the information given in the question, therefore mostly lower band answers were seen..

Questions that drew upon practical skills and understanding were answered inconsistently. Some candidates were successful in identifying variables that needed to be controlled and were successful in describing aspects of a standard method, e.g. measuring pulse rate. However the understanding of repeatability varied, and the majority of candidates could not refine/improve a given method.

In the task based assessment, pack B was more popular than pack A. However, candidates appeared to perform equally well across both packs. Candidates' performance in this unit was comparable to last year and there were less gaps in candidate scripts than in previous years. In the planning section there was still some confusion on variables. Most could write a method, but often repeats and range were missed. Collecting and recording was the best section, however questions on resolution were often answered badly or missed out. In the analysis section, graph plotting was often an issue. Evaluations and risk assessment were the weakest sections.

In the practical unit, the performance of candidates across all the tasks was pleasing with good evidence that candidates were familiar with practical work and the analysis of practical results. Hypotheses were usually well done, as were identification of variables. Risk assessments were not well done. Candidates were usually able to record their results logically although units were often incorrect, e.g. the unit for hydrogen peroxide concentration, and conversion of units was issue for many candidates. Many produced suitable graphs although many did not produce linear scales or suitable lines of best fit. Key terms such as repeatability and reproducibility were well-known, but many candidates were not clear in their responses and consequently lost marks in explanations.

APPLIED SCIENCE (SINGLE AWARD)

GCSE

Summer 2025

UNIT 1: FOUNDATION TIER

Overview of the Unit

The exam paper included questions based on all three assessment objectives so tested recall of knowledge, (40%), application and understanding of knowledge, (40%), and analysis, interpretation and evaluation of information (20%). This paper examined topics from the three science disciplines offered in the science suite.

There was an increase in objective style questions this year. Performance in these questions was mixed. The remainder of the paper was comparable with previous series. It provided a fair test for the candidates at Foundation Tier and differentiated well. The degree of difficulty of questions increased throughout the paper, with questions in the common section providing the most challenge.

The objective style question parts were generally well attempted. This style of questioning made them more accessible to candidates. However, many candidates lacked the basic knowledge and understanding of the topics assessed through some of these questions and probably made random guesses. The performance of candidates in other recall questions was poor. This is nothing new and has been commented on in exam reports for several series.

Candidates need to take more care when reading all the information, take note of it and act on it. Two question parts required candidates to complete circuit diagrams. As a result, they did not have dotted lines to write an answer on. Too frequently, question parts such as this were not attempted. This has been commented on in previous reports.

Some questions that assessed mathematical skills were not well answered. Equations were given in the appropriate form in the question part. However, many candidates substitute incorrectly into given equations. Sometimes this is due to incorrectly selecting data from the wrong option or by not consider units. Another problematic area is the incorrect rounding of final answers usually when an ecf applies. This always attracts a penalty. It is emphasised that workings should be shown in the provided spaces when answering calculation questions. Marks are often provided for selection of values and substitution. These marks cannot be awarded if all that is shown is an incorrect answer on the answer line. The method of calculating the area of a square was not well known. Errors in simple additions were seen.

Errors were made in graph work.

The QER question was very poorly answered. Some responses are very difficult to read, and many spelling and capitalisation errors are seen.

The non-attempt rate varied between 10% and 58%.

Comments on individual questions/sections

- Q.1** (a) The energy source of food chains was not well known.
- (b) All question parts were based on a food chain and were well answered. Identifying the secondary consumer caused most problems.
- Q.2** (a) Many candidates could identify at least one method of heat transfer.
- (b) Few candidates could evaluate the data to decide who to agree with. Many responses did not include data so failed to earn any credit.
- Q.3** (a) It is possible that some candidates did not notice this question since the non-attempt rate was about 53%. Notice the absence of dotted lines.
- (b) A minority of candidates were able to get any credit in all parts. This is despite all equations being provided and involving one stage calculations. The non-attempt rate rose from 31% to 41% from part (i) to (iv).
- (c) (i) Few candidates were able to draw a parallel circuit. The non-attempt rate was 43%.
- (ii) There was a lack of knowledge and understanding about the effect on a circuit of adding another component in parallel.
- Q.4** (a) There was confusion about the description for each term.
- (b) All question parts were based on the diagram of a fractionating column. Only in part (i) were mostly correct answers seen. It was rare to see correct answers in the remaining parts. Between parts (ii) and (iv) the non-attempt rate rose from about 30% to 48%.
- Q.5** (a) (i) Most candidates earned at least one mark for adding regions to the em spectrum but often X-rays and IR were reversed.
- (ii) Correct words underlined in a minority of cases.
- (b) About half of those candidates who attempted the calculation were awarded marks. Some candidates made an error in adding the correct number of zeroes to their answer. Others made substitution errors. The non-attempt rate was about 30%.
- Q.6** This QER is based on a practical to prepare a salt. Very few acceptable improvements to the method were seen and as a result the facility factor was very low. About 36% of candidates failed to attempt the question.
- Q.7** (a) Each of the parts (i) to (iii) were tick box questions. The correct box was ticked about half of the time in parts (i) and (ii) and slightly more in part (iii).
- (b) The question included a table that needed to be completed to determine the relative molecular mass of a compound. The total atomic mass of sulfur was often correct but errors were made in completing the row for oxygen. Surprisingly, errors were made in adding two numbers when determining M_r .

- (c) Mostly the correct choice was underlined.

Q.8 Roughly half of candidates attempted these question parts.

- (a) (i) A minority of candidates identified the ions present from the data provided.
- (ii) It was rare for the powder to be named correctly.
- (b) The type of ions that can be identified by a flame test was not well known.

Q.9 The majority of candidates were able to place the statements in the correct order.

Q.10 These question parts were based on an investigation into PV cells. The non-attempt rate varied between 24% and 58%.

- (a) (i) About 24% of candidates failed to attempt to plot the graph. Those that did, usually made at least one error. Quite often the point for a tilt angle of 40° was plotted incorrectly. On other occasions, the instruction to draw a suitable curve was ignored and straight lines joining point to point were added.
- (ii) Mostly correct answers seen in parts I and II. It was very rare to award a mark in part III.
- (b) Few correct answers seen. Many candidates ignored the instruction to use data for a tilt angle of 30° . Others answered the question without making a calculation.
- (c) (i) The correct area of the cell was seen on a small minority of occasions.
- (ii) About 58% of candidates did not attempt to answer the question. Of those that did, a very small number earned credit. Once again, candidates ignored the requirement to use data for a certain angle.
- (d) Candidates did not have the knowledge to answer these question parts. Plus, about 50% did not attempt to answer them.

APPLIED SCIENCE (SINGLE AWARD

GCSE

Summer 2025

UNIT 1: HIGHER TIER

Overview of the Unit

The exam paper included questions based on all three assessment objectives so tested recall of knowledge, (40%), application and understanding of knowledge, (40%), and analysis, interpretation and evaluation of information (20%). This paper examined topics from the three science disciplines offered in the science suite.

The paper was comparable with previous series. It provided a fair test for the candidates at Higher Tier and differentiated well. The degree of difficulty of questions increased throughout the paper, with questions in the common section providing the least challenge.

Performance of candidates in recall questions was poor. This is nothing new and has been commented on in exam reports for several series.

Candidates need to take more care when reading all the information, take note of it and act on it. One question part required candidates to draw a food chain. As a result, it did not have dotted lines to write an answer on. Too frequently, a question part such as this is not attempted. This has been commented on in previous reports.

Some questions that assessed mathematical skills were not well answered. Most equations were given in the appropriate form in the question part. However, many candidates substitute incorrectly into given equations. One equation required rearranging, and this proved too difficult for most candidates. Another problematic area was the incorrect rounding of final answers usually when an ecf applies. This always attracts a penalty. It is emphasised that workings should be shown in the provided spaces when answering calculation questions. Marks are often provided for selection of values and substitution. These marks cannot be awarded if all that is shown is an incorrect answer on the answer line. The method of calculating the area of a square was not well known. Most candidates struggled with handling numbers given in standard form.

Errors were made in graph work.

The QER question was very poorly answered. Some responses were very difficult to read.

Comments on individual questions/sections

Q.1 These question parts were based on an investigation into PV cells.

- (a) (i) The majority of candidates were able to plot the graph. However, common errors were seen for other candidates. Quite often the point for a tilt angle of 40° was plotted incorrectly. On other occasions, the instruction to draw a suitable curve was ignored and straight lines joining point to point were added.
- (ii) Mostly correct answers seen in parts I and II. It was rare to award more than one mark in part III.

- (b) Correct answers were seen in the majority of instances. Some candidates ignored the instruction to use data for a tilt angle of 30° .
 - (c)
 - (i) The correct area of the cell was seen in a minority of instances.
 - (ii) About 20% of candidates did not attempt to answer the question. Of those that did, a small number earned credit. Once again, candidates ignored the requirement to use data for a certain angle.
 - (d) Many candidates did not have the knowledge to answer these question parts correctly.
- Q.2**
- (a) The constituents of river water were not well known.
 - (b) The question parts were based on given solubility curves. Parts (i) and (ii) were well answered, especially (ii). The attempt rate dropped in parts (iii) and (iv) and few correct answers seen. Most candidates did not understand the term saturated solution.
- Q.3**
- (a)
 - (i) Nearly all candidates were unable to use the equation for parallel resistors. Some made the correct substitutions only. No lowest common denominators were seen. The most common answer was 54 ohms.
 - (ii) Mostly correct answers seen after allowing an ecf.
 - (iii) Few correct answers seen. Errors in substitution were common. For some reason candidates used a value for total resistance other than their answer in part (ii).
 - (iv) No correct answers seen. Most candidates just divided 9 by 18.
 - (b) Most candidates did not know the function of a thermistor.
- Q.4**
- (a) The table was usually completed correctly. It was surprising that 10% of candidates did not attempt this question.
 - (b) This QER question did not depend on recall. Candidates were required to evaluate the data and select the best options to match the budget. The mean mark was 1.9. Few responses reached the middle or upper band of marks. It was a pleasure to read the limited number of upper band accounts. Data was often omitted so the mark was limited to one. Some selections of insulation methods did not match the £3800 budget. These scored zero. There were two ways of spending £3800 and candidates were expected to compare the savings in power loss and payback time for these selections. Few candidates achieved this. A common way of determining payback time was to add the individual payback times which is, of course, incorrect.
 - (c) Knowledge of convection currents was very poor. About 48% of candidates did not attempt to answer the question.
- Q.5** All question parts depended on recall of knowledge and all parts were poorly answered. The non-attempt rates varied from 16% to 62%.

- Q.6** (a) It was common to award one mark only for balancing the LHS of the equation.
- (b) All parts were poorly answered. Candidates did not know the term neutralisation and were unable to name the salt produced. A minority knew that water was also a product of the reaction.
- Q.7** (a) Most candidates could not describe how to use a quadrat.
- (b) An explanation of a kite diagram was given in the introduction to the question. Under half of candidates could answer questions based on the kite diagram.
- Q.8** (a) There were no dotted lines after the question and 32% of candidates did not attempt to give an answer. Half of the remaining candidates drew the required food chain to earn both marks.
- (b) Details of the carbon cycle and how living things contribute towards it were not well known. It was rare to award a mark.
- (c) Bioaccumulation was not well known.
- Q.9** Most candidates were unable to rearrange the equation and handle standard form. As a result, few correct answers were seen.

APPLIED SCIENCE (SINGLE AWARD)

GCSE

Summer 2025

UNIT 2: FOUNDATION TIER

Overview of the Unit

The examination paper assessed candidates through a series of questions across a range of topics, comparable with previous examinations in this qualification. The questions tested candidates' recall of knowledge, (40%), application and understanding of knowledge, (40%), and analysis, interpretation and evaluation of information (20%). This paper examined topics from the three science disciplines offered in the science suite, in line with the specification for this qualification.

The examination paper was of comparable demand with those of the previous series; the assessment differentiated across a range of candidates. The questions progressed in their degree of difficulty and challenge, whereby the most challenging questions occurred towards and within the common tier section of the examination. The initial questions in the examination proved accessible to most candidates and most candidates scored well within this point of the examination paper. Question 5 proved particularly accessible to candidates, where the skill area of application and understanding of knowledge was more predominantly assessed.

Recall questions were well answered within the first few questions of the paper, where the recall sometimes required shorter answers or a choice of answers from suggestions given. Further into the examination paper, where recall required scientific explanation or more complex interpretation, candidates struggled to recall and then correctly apply their knowledge and understanding. Within the common tier questions, candidates struggled with the refining of experimental design and procedure, even when given common apparatus.

Questions that drew upon practical skills and understanding were answered inconsistently. Some candidates were successful in identifying variables that needed to be controlled and were successful in describing aspects of a standard method (pulse rate context). The understanding of repeatability varied- a considerable number of candidates could recall repeatability in terms of results being 'close together', though candidates could rarely process the data provided in order to evidence this understanding.

Questions that assessed mathematical skills were generally well attempted. Interpretation of a velocity-time graph was overall well answered, with candidates calculating acceleration with some degree of success. Candidates also demonstrated an understanding of how acceleration is represented by the gradient of a graph. Identifying half-life on a graph was much less successful for candidates, and the half-life calculation was poorly answered. Candidates were quite confident in describing trends and analysing data presented in graphical format. However, they were inconsistent in correctly quoting data to evidence trends in graphs.

Assessment objective (AO1) was a challenge for candidates across the examination paper. Very few candidates could correctly complete more than one correct label of the heart, or to state the function of valves. The labelling of the fission reactor was weaker still. The majority of responses gained some credit for the QER question on blood vessels, though responses generally fell into the lower marking band. Blood vessel structure was better understood than blood vessel function. Candidates demonstrated a more accurate understanding of arteries and veins, than capillaries.

Questions that required evaluation of a conclusion (an AO3 skill) were attempted by a significant number of candidates, especially where the question involved calculation/s to prove or disprove a given statement. This style of AO3 question was more correctly answered than questions that required improvement to experimental design (also an AO3 skill).

Comments on individual questions/sections

- Q.1** The question was accessed by the vast majority of candidates. Candidates were most confident in describing the function of the heart. Most candidates could identify one of the heart labels correctly (usually the ventricle). Candidates demonstrated a lesser understanding of valves.
- Q.2** The majority of candidates gained some marks for each section, apart from recognizing the time period 'X' as 'recovery'. Candidates were confident in identifying where a pulse could be detected on the body. Most candidates gained at least one mark for describing evidence from the graph.
- Q.3** Candidates demonstrated weaker overall understanding of the nuclear fission reactor. Candidates struggled to label the fuel rods on the diagram, to describe the role of the moderator and to identify the chain reaction - though the majority of candidates did attempt these questions. Candidates require more practice with regard to simple half-life calculations and identifying half-life from a graph.
- Q.4** Candidates were more confident with the context and calculations of this question. However, in part (a), a number of candidates did not attempt the two mean calculations, as the question asked. Candidates could not apply the meaning of the term 'range' - a question that is usually well answered in practical examinations. A number of candidates gained no marks for part (c) as they included no workings and then rounded the answer incorrectly - practice of numerical rounding would be of benefit. Candidates were more successful in using data from the velocity-time graph.
- Q.5** Candidates were confident and successful in answering this question. For example, most candidates could describe at least one trend shown in the graph, they could relate the graph data to the data in the table, and they could derive information from the Cancer Research graphic.
- Q.6** Assessment Objective 1 - knowledge and understanding - was assessed via the QER question on blood vessels. The question was attempted by the majority of candidates, though a number focused on describing the diagrams provided rather than recalling structure and function. An understanding of arteries and veins was stronger than the understanding of capillaries. Structure was more accurately described than function. Descriptions of valves in veins was the most frequent correct response, while the mean score for candidates remained within the lower band of marking.

- Q.7** The common tier questions proved a challenge for many candidates. Candidates could not identify the improvement of a gas syringe. Access to the glossary of key practical terms would be of benefit. Few candidates could recall factors that increase the rate of reaction or basic collision theory. Candidates were more confident in using graph data to describe reaction time.
- Q.8** Many candidates attempted the part (a) calculation, with a great deal of success. Candidates were also confident in attempting the Punnet square diagram, where a number of candidates gained one ecf mark for the correct offspring. Understanding of key genetic terminology proved a challenge, with a number of candidates misunderstanding the term 'genotype' and answering by using the key for the family tree.

APPLIED SCIENCE (SINGLE AWARD)

GCSE

Summer 2025

UNIT 2: HIGHER TIER

Overview of the Unit

The examination paper assessed candidates through a series of questions across a range of topics, comparable with previous examinations in this qualification. The questions tested candidates' recall of knowledge, (40%), application and understanding of knowledge, (40%), and analysis, interpretation and evaluation of information (20%). This paper examined topics from the three science disciplines offered in the science suite, in line with the specification for this qualification.

The examination paper was of comparable demand with those of the previous series; the assessment differentiated across a range of candidates. The questions progressed in their degree of difficulty and challenge; the most challenging questions generally occurred towards the end of the examination. The common tier questions, at the start of the examination, generally proved more accessible to candidates and most candidates scored well within this point of the examination paper.

Recall questions were more successfully answered within the first few questions of the paper, where scientific knowledge was less challenging for higher tier candidates. Further into the examination paper, where recall required scientific explanation or more complex interpretation, candidates struggled to recall and then correctly apply their knowledge and understanding. This was especially true when less predictable aspects of the specification were examined, such as evaluating drug treatments. Throughout the examination paper, candidates struggled with the refining of experimental design and procedure, even when given common apparatus.

Questions that assessed mathematical skills were well attempted by most candidates. Calculating the energy content of food was the most successfully answered mathematical question, across a range of candidates. Calculations based on a velocity-time graph were less successful, even though this format of higher tier question should be known and practised by candidates. Candidates can gain credit for including their workings for calculations and ensuring that they can round numerical answers correctly. Candidates would benefit from greater practice of half-life calculations. Descriptions of graphical trends were more successful and candidates were much more confident in demonstrating this skill.

Assessment objective AO1 was a challenge for candidates across the examination paper. Even within the common tier questions, few candidates could state more than one factor that increases the rate of a chemical reaction. Candidates were even less confident in understanding and applying key genetic terminology. Although most candidates attempted to answer recall/understanding questions across the examination paper, candidates needed much more accurate scientific understanding of basic higher tier concepts, such as double circulation and the immune response.

Questions that required evaluation of a conclusion (an AO3 skill) were attempted by a significant number of candidates, especially where the question involved mathematical interpretation to prove or disprove a given statement. This style of AO3 question was more correctly answered than questions that required improvement to experimental design (also an AO3 skill).

Comments on individual questions/sections

- Q.1** Candidates were most confident in using the graphical data to evaluate reaction times. Very few candidates could identify the experimental improvement of using a gas syringe. Access to the glossary of key practical terms would be of benefit to candidate knowledge and understanding. Few candidates could recall basic collision theory.
- Q.2** Candidates were successful in calculating cases of cystic fibrosis. Candidates were confident in attempting the Punnett square diagram, including the correct identification of parental genotype. Understanding of key genetic terminology proved a challenge, with few candidates being able to correctly define a gene or an allele.
- Q.3** Many candidates understood the changes that occur during mutation, though few candidates could identify an antigen. Graphical comparison was very confidently answered. A number of candidates could link the immune response to antibody production, though understanding of the role of memory cells was less known.
- Q.4** Very few candidates could recall the nature of beta and gamma radiation. The QER question was well attempted by a wide range of candidates, though candidates struggled to identify the correct radioisotope for the uses stated. Candidates often stated the radiation emitted and whether there was a short or long half-life, but they rarely explained the significance of these factors.
- Q.5** A small number of candidates were confident in their labelling of the heart. Most candidates could correctly complete only one label, commonly the left ventricle. Candidates should show full mathematical workings when faced with calculations such as cardiac output. Correct workings can then be credited, even if the final answer is incorrect. A number of candidates lost marks due to incorrect rounding of a final answer.
- Q.6** Many candidates could link high blood pressure to salt intake, though few candidates processed the data provided in order to evidence their judgement. Candidates were both confident and successful in calculating the energy content of food. Candidates struggled to explain experimental improvements.
- Q.7** Few candidates had an understanding of the benefits and problems of aspirin. A number of candidates successfully described a placebo. The majority of candidates understood the need to compare dosage within a clinical trial.
- Q.8** Overall, candidates struggled with this question, even though similar questions have been posed across a range of past examinations. A small number of successful candidates attempted this question, including workings for calculations. A number of candidates did not attempt the calculation of total distance travelled.

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UNIT 3: FOUNDATION TIER

Overview of the Unit

- All AOs are assessed in this Unit.
- Both packs tested candidates' ability to: plan; carry out experiments; make measurements and record them; analyse data; evaluate methods and data; and to assess risk.
- Pack A tested candidates' ability within the topics of: Transfer and recycling of nutrients; Scientific detection.
- Pack B tested candidates' ability within the topics of: Underpinning energy concepts; Transfer and recycling of nutrients.
- Pack B was more popular than Pack A.
- Candidates appeared to generally perform equally well across both packs.
- Candidates' performance in this unit was commensurate with last year.
- Candidates' ability to answer questions fully continues to improve, and many fewer candidates were leaving questions blank.
- It was obvious that some centres had practiced assessments on this unit with their candidates, whilst other centres had not. Centres that do not practice this unit with their candidates are putting them at a disadvantage.

Comments on individual questions/sections

Activity 1

Task A Planning

- Some candidates are still confused by the terms independent, dependent and controlled variables.
- The style of choose the variables from a list, allowed more candidates to correctly select the independent and dependent variables, particularly as these are generally identifiable from the introduction section. Some candidates in both packs still had problems identifying the controlled variables. It should be noted by centres that pieces of apparatus are not variables, unless qualified, e.g. 'the ball' is not a variable, but the 'type' of ball is. Many candidates on the Foundation tier selected 'the ruler' as a controlled variable for Pack A.
- Most candidates from both packs were able to draw a labelled diagram of the apparatus, and avoided the temptation to effectively draw a list of apparatus. The quality of the diagrams produced by candidates in both packs were extremely variable, it is suggested that centres practice drawing good quality 2D scientific diagrams of apparatus with their candidates.
- Most candidates in both packs attempted to write a method, and the quality of candidates' SPaG continues to improve, with many candidates obviously going back over their method and correcting spelling and punctuation.
- Centres are advised to teach their candidates to write methods using a numbered list - it is much easier for candidates to check that they have started sentences with a capital letter and finished them with a full stop. Numbered lists also make it much easier for candidates to check their methods for errors or omissions.

- Candidates need to be able to spell key scientific words correctly. These are generally words that can be found in the introduction section to the activity.
- Centres need to remind their candidates to check that their methods include repeats and the correct range/interval for the experiment, as requested in the task instructions.
- Candidates continue to find constructing a risk assessment difficult.
- Centres are reminded to run through the general structure of a CLEAPSS Student Safety Sheet, as most of the expected responses are contained within each one, if applicable.
- Please ensure that candidates know that:
 - Hazards require the specific nature of the hazard to be stated (e.g. the end of the clamp/ruler is pointed or could fall).
 - Risks must have an injury and an action (e.g. the end of the pointer/ruler could cause an eye injury or bruise the skin if it falls whilst bouncing the ball/dropping the cupcake cases). In both of these experiments, as the hazards were minimal and the risks negligible, it was perfectly acceptable to write 'there are no hazards' / 'no specific risks' / 'no specific control measures'. Any risks identified must be related to the hazard.
 - Control measures need to be appropriate for the stated hazard and risk, (e.g. wearing goggles to prevent eye injury from the pointed end of a clamp, should it fall).

Task B Collecting and recording

- This section continues to be high scoring.
- Many candidates omitted to write the resolution of their stopwatch (Pack A) or ruler (Pack B) – just leaving them blank, whilst other candidates seemed confused by having one space to write the resolution and another, next to it, for the unit. Some candidates wrote different units in both spaces.
- Most candidates attempting Pack A managed to measure the drop times for the different numbers of stacked cupcake cases but a minority of candidates did not repeat their measurements four times to give them five different values.
- The vast majority of candidates attempting Pack B managed to take repeated readings across the stated drop height range, with many obviously taking care to ensure that their repeats were similar to each other. A small minority of candidates only repeated their measurements twice or three times, rather than the stated number of four times.
- Some candidates still need practice with listing all the units on tables, and making sure that they do not include the units in the body of the table. A significant minority of candidates are still struggling to use the correct (consistent) number of decimal places on columns of numbers, particularly when calculating means.
- A significant minority of tables were very scrappy. Please encourage candidates to use the space to record their rough data and then produce a good quality 'best' table in the space at the bottom of the page.

Task C – Analysis

- The most common difficulty involved plotting the graphs.
- Candidates need to be more critical of their data, and check for obvious anomalies. These should be identified and removed from any mean calculations.
- Candidates should practice calculating mean values of repeated measurements and expressing them to the same number of decimal points as the (primary) data. This was an issue for a significant minority of candidates from both Pack A and Pack B.
- Candidates still find it very challenging to produce accurate graphs. Common mistakes involve: non-linear, and inappropriate scales; inaccurate point plotting; and poor best-fit line drawing (if appropriate). Candidates in Pack A particularly found drawing a best fit line a challenge, with many candidates merely joining the points together with a straight line. The graph in Pack B proved to be more successful, although many candidates omitted to write an origin on their y-axis scale and then designed a scale that was inappropriate. Candidates should be reminded that the scale should be over half of the

available plottable area. Centres should continue to give candidates lots of practice on this skill and give plenty of opportunities to design and plot simple graphs from data.

- It was pleasing to see that most candidates were able to describe the pattern in their results, although a number of candidates for both packs did not relate the y-values of the graph to the x-axis values.
- Both packs required candidates to extract information from their graph. Most candidates attempting both packs were able to correctly read a value from their graph, and were able to correctly draw the second line, labelled B. In some cases, candidates were hampered by thickly drawn best-fit lines that did not allow them to obtain the correct tolerance.
- A significant majority of candidates on Pack B were able to perform the calculations given, and most candidates on Pack A were able to draw the dandelion seed in the correct orientation, but most could not give a reason why this was an advantage to the dandelion.

Task D – Evaluation

- As still continues to be the pattern, candidates find the evaluation component of any task hard.
- When asked about the suitability of the experiment, many candidates write about their own performance during the experiment, or state that the method was easy to follow. Candidates need to either examine the pattern in the data or give a comment about the uncertainty of the data.
- Candidates need to be more aware of the meaning of repeatability. In both packs candidates were asked to assess the repeatability of their data and a significant minority still refer to all their data being similar, when they should be focusing on the similarity of their repeated data values. Many candidates do not subsequently refer to using repeated values to calculate a mean value.
- Candidates are better at spotting inaccuracies and suggesting improvements, although extensions to an investigation are not considered to be improvements.
- Many candidates found explaining the suggestion/agreement question at the end of this section for in both packs a challenge. Candidates should take more time reading this question, and think about a suitable response, before writing their final answer. There is no credit for a simple Yes/No answer, an explanation is needed.

Activity 2

Task A – Analysis

- A significant minority of candidates on both packs did not circle the anomalous value in the table, suggesting that they did not read the questions carefully. Most attempted to calculate the missing mean values, but frequently did not remove the anomaly, or did not round their answers correctly.
- In both packs, most candidates were able to draw some form of graph, and it was pleasing to note that very few plotted bar charts. However, the scale needed for Pack A proved to be an issue for some candidates where they used values on the y-axis lifted straight off the data in the table, rather than constructing a linear scale. Many candidates on Pack B plotted at least one point out of tolerance. Many candidates struggled to draw a suitable smooth best fit line, with many candidates drawing wispy, bifurcated lines, or completely missing the obvious best-fit.
- Most candidates were able to state the relationship between the two variables plotted on the graph, although a significant minority of candidates on Pack B incorrectly used the terms faster and slower to describe the pattern.
- Most candidates found the calculations challenging, particularly with Pack A, and some had issues with rounding. Centres need to practice this with their candidates.

- Candidates are generally quite good at extracting information from text/tables/graphs/diagrams, and most candidates on both packs gained some credit for Question 2. Many candidates scored full marks for this question in Pack A, although the calculation caused some issues for some candidates. Most candidates on Pack B and were able to match the correct seed to its dispersal method. Stating two adaptations of the sticky weed plant in Pack B proved more of a challenge for some candidates.

Task B – Evaluation

- As has been the case historically, candidates still find evaluations very challenging.
- For both packs, when asked about the suitability of the experiment, many candidates wrote about the method being easy to follow. Candidates need to either examine the pattern in the data, or give a comment about the uncertainty of the data.
- Candidates found it quite hard to explain why the results were repeated. Most candidates that gained credit, mentioned the need to calculate a mean value. A small minority wrote about spotting anomalies or reducing uncertainty.
- Most candidates on Pack B really struggled to suggest why a pointer was used to control the drop height, and only a few managed to suggest an answer based on ensuring that the objects were released from the same height for each repeated measurement. Many candidates on Pack A were unable to explain coherently why the mass of the crucible was measured.
- Many candidates were able to suggest human error as the biggest uncertainty for Pack B, but only a minority were able to link the human error to coordinating releasing the cupcake case and starting/stopping the stopwatch. Most candidates gained credit for explaining why the crucible lid was raised periodically for Pack A.
- Only a minority of candidates gained any credit for the suggestion/agreement question at the end. Few identified the increase in uncertainty due to the range being too small for the mass of magnesium in Pack A, but more candidates had success stating that the wind would blow the seeds further away from the tree in Pack B. Some candidates gave correct reasons for Pack B, but did not agree with Sian.

APPLIED SCIENCE (SINGLE AWARD)

GCSE

Summer 2025

UNIT 3: HIGHER TIER

Overview of the Unit

- All AOs are assessed in this unit.
- Both packs tested candidates' ability to: plan; carry out experiments; make measurements and record them; analyse data; evaluate methods and data; and to assess risk.
- Pack A tested candidates' ability within the topics of: Transfer and recycling of nutrients; Scientific detection.
- Pack B tested candidates' ability within the topics of: Underpinning energy concepts; Transfer and recycling of nutrients.
- Pack B was more popular than Pack A.
- Candidates appeared to generally perform equally well across both Packs.
- Candidates' performance in this unit was commensurate with last year.
- Candidates' ability to answer questions fully continues to improve, and many fewer candidates were leaving questions blank.
- It was obvious that some centres had practiced assessments on this unit with their candidates, whilst other centres had not. Centres that do not practice this unit with their candidates are putting them at a disadvantage.

Comments on individual questions/sections

Task A Planning

- Some candidates are still confused by the terms: independent; dependent and controlled variables.
- As with previous years, a significant minority of Higher Tier candidates neglected to state any of the variables. Centres should point out to candidates that most of these are generally identifiable from the introduction section. Some candidates in both packs still had problems identifying the control variables. It should be noted by centres that pieces of apparatus are not variables, unless qualified, e.g. 'the ball' is not a variable, but the 'type' of ball is. Many candidates on the higher tier selected 'the ruler' as a controlled variable for Pack A.
- Most candidates from both Packs were able to draw a labelled diagram of the apparatus, and avoided the temptation to effectively draw a list of apparatus. The quality of the diagrams produced by candidates in both packs were extremely variable, it is suggested that centres practice drawing good quality 2D scientific diagrams of apparatus with their candidates.
- Most candidates in both packs attempted to write a method, and the quality of candidates' SPaG continues to improve, with many candidates obviously going back over their method and correcting spelling and punctuation.
- Centres are advised to teach their candidates to write methods using a numbered list - it is much easier for candidates to check that they have started sentences with a capital letter, and finished them with a full stop. Numbered lists also make it much easier for candidates to check their methods for errors or omissions.
- Candidates need to be able to spell key scientific words correctly. These are generally words that can be found in the introduction section to the activity.

- Centres need to remind their candidates to check that their methods include repeats and the correct range/interval for the experiment, as requested in the task instructions.
- Candidates continue to find constructing a risk assessment difficult.
- Centres are reminded to run through the general structure of a CLEAPSS Student Safety Sheet, as most of the expected responses are contained within each one, if applicable.
- Please ensure that candidates know that:
 - Hazards require the specific nature of the hazard to be stated (e.g. the end of the clamp/ruler is pointed or could fall).
 - Risks must have an injury and an action (e.g. the end of the pointer/ruler could cause an eye injury or bruise the skin if it falls whilst bouncing the ball/dropping the cupcake cases). In both of these experiments, as the hazards were minimal and the risks negligible, it was perfectly acceptable to write 'there are no hazards' / 'no specific risks' / 'no specific control measures'. Any risks identified must be related to the hazard.
 - Control measures need to be appropriate for the stated hazard and risk, (e.g. wearing goggles to prevent eye injury from the pointed end of a clamp, should it fall).

Task B Collecting and recording

- This section continues to be high scoring.
- Many candidates omitted to write the resolution of their stopwatch (Pack A) or ruler (Pack B) – just leaving them blank, whilst other candidates seemed confused by having one space to write the resolution and another, next to it, for the unit. Some candidates wrote different units in both spaces.
- Most candidates attempting Pack A managed to measure the drop times for the different numbers of stacked cupcake cases but a minority of candidates did not repeat their measurements four times to give them five different values.
- The vast majority of candidates attempting Pack B managed to take repeated readings across the stated drop height range, with many obviously taking care to ensure that their repeats were similar to each other. A small minority of candidates only repeated their measurements twice or three times, rather than the stated number of four times.
- Some candidates still need practice with listing all the units on tables, and making sure that they do not include the units in the body of the table. A significant minority of candidates are still struggling to use the correct (consistent) number of decimal places on columns of numbers, particularly when calculating means.
- A significant minority of tables were very scrappy. Please encourage candidates to use the space to record their rough data and then produce a good quality 'best' table in the space at the bottom of the page.

Task C – Analysis

- The most common difficulty involved plotting the graphs.
- Candidates need to be more critical of their data, and check for obvious anomalies. These should be identified and removed from any mean calculations.
- Candidates should practice calculating mean values of repeated measurements and expressing them to the same number of decimal points as the (primary) data. This was an issue for a significant minority of candidates from both Pack A and Pack B.
- Candidates still find it very challenging to produce accurate graphs. Common mistakes involve: non-linear, and inappropriate scales; inaccurate point plotting; and poor best-fit line drawing (if appropriate). Candidates in Pack A particularly found drawing a best fit line a challenge, with many candidates merely joining the points together with a straight line. The graph in Pack B proved to be more successful, although many candidates omitted to write an origin on their y-axis scale and then designed a scale that was inappropriate. Candidates should be reminded that the scale should be over half of the available plottable area. Centres should continue to give candidates lots of practice on this skill, and give plenty of opportunities to design and plot simple graphs from data.

- It is pleasing to see that most candidates were able to describe the pattern in their results, although a number of candidates for both packs did not relate the y-values of the graph to the x-axis values.
- Both packs required candidates to extract information from their graph. Most candidates attempting both packs were able to correctly read a value from their graph, and were able to correctly draw the second line, labelled B. In some cases, candidates were hampered by thickly drawn best-fit lines that did not allow them to obtain the correct tolerance.
- A significant majority of candidates on Pack B were able to perform the calculations given, and most candidates on Pack A were able to compare features on the cupcake case and the dandelion seed, but most could not give a reason why dandelions disperse their seeds in dry air by using information in the photographs

Task D – Evaluation

- As still continues to be the pattern, candidates find the evaluation component of any task hard.
- When asked about the suitability of the experiment, many candidates wrote about their own performance during the experiment, or stated that the method was easy to follow. Candidates need to either examine the pattern in the data, or give a comment about the uncertainty of the data.
- Candidates need to be more aware of the meaning of repeatability. In both packs candidates were asked to assess the repeatability of their data and a significant minority referred to all their data being similar, when they should be focusing on the similarity of their repeated data values. Many candidates do not subsequently refer to using repeated values to calculate a mean value.
- Candidates are better at spotting inaccuracies and suggesting improvements, although extensions to an investigation are not considered to be improvements.
- Many candidates found explaining the suggestion/agreement question at the end of this section for in both packs a challenge. Candidates should take more time reading this question, and think about a suitable response, before writing their final answer. There is no credit for a simple Yes/No answer, an explanation is needed.

Activity 2

Task A – Analysis

- A significant minority of candidates on both packs did not circle the anomalous value in the table, suggesting that they did not read the questions carefully. Most attempted to calculate the missing mean values, but frequently did not remove the anomaly, or did not round their answers correctly.
- In both packs, most candidates were able to draw some form of graph. However, the scale needed for Pack A proved to be an issue for a few candidates where they used values on the y-axis lifted straight off the data in the table, rather than constructing a linear scale. Many candidates on Pack B plotted at least one point out of tolerance. Many candidates struggled to draw a suitable smooth best fit line, with many candidates drawing wispy, bifurcated lines, or completely missing the obvious best-fit.
- Most candidates were able to state the relationship between the two variables plotted on the graph, although a significant minority of candidates on Pack B incorrectly used the terms faster and slower to describe the pattern.
- A significant majority of candidates on Pack A were able to perform the calculations to determine the formula of magnesium oxide, but many candidates, in attempting Pack B, found the calculations challenging, and some had issues with rounding.
- Candidates were generally quite good at extracting information from text/tables/graphs/diagrams, and most candidates on both packs gained some credit for Question 2. Many candidates scored full marks for this question in Pack A, although the

calculations caused some issues for some candidates. Most candidates on Pack B and were able to match the correct seed to its dispersal method. Stating two adaptations of the sticky weed plant in Pack B proved more of a challenge for some candidates.

Task B – Evaluation

- As has been the case historically, candidates still find evaluations very challenging.
- For both packs, when asked about the suitability of the experiment, many candidates write about the method being easy to follow. Candidates need to either examine the pattern in the data, or give a comment about the uncertainty of the data.
- Candidates found it quite hard to explain why the results were repeated. Most candidates that gained credit, mentioned the need to calculate a mean value. A small minority wrote about spotting anomalies or reducing uncertainty.
- Most candidates on Pack B really struggled to suggest why a pointer was used to control the drop height, and only a few managed to suggest an answer based on ensuring that the objects were released from the same height for each repeated measurement. Many candidates on Pack A were unable to explain coherently why the mass of the crucible was measured.
- Many candidates were able to suggest human error as the biggest uncertainty for Pack B, but only a minority were able to link the human error to coordinating releasing the cupcake case and starting/stopping the stopwatch. Most candidates gained credit for explaining why the crucible lid was raised periodically for Pack A.
- Only a minority of candidates gained any credit for the suggestion/agreement question at the end. Few identified the increase in uncertainty due to the range being too small for mass of magnesium in Pack A, but more candidates had success stating that the wind would blow the seeds further away from the tree in Pack B. Some candidates gave correct reasons for Pack B but did not agree with Sian.

APPLIED SCIENCE (SINGLE AWARD)

GCSE

Summer 2025

UNIT 4: PRACTICAL UNIT

Overview of the Unit

In this unit candidates are assessed on their practical skills including, forming hypotheses, recognising and preventing hazards and risks, recording and presenting data, understanding the variables that are involved in experiments, evaluating the success of the experiment and planning improvements. There was evidence that candidates are familiar with practical work and the analysis of practical results, although in some areas candidates' skills were not as well-developed as in previous series, this was particularly evident in graph plotting.

The nature of experimental work means that, on occasions, centres may feel the need to provide candidates with unformatted results to use in section B for graph plotting. This happens in a small number of cases each year. This year it was notable that many centres who gave their candidates results did not explain that they had done so and did not include a copy with the scripts. It is imperative that in such circumstances centres provide a copy of the original results to ensure that markers can accurately evaluate and award credit for correct data plotting.

The tasks all proved to be accessible for most candidates who usually attempted all sections. As in previous series, candidates were largely successful in making hypotheses and in identifying variables. Notable areas that candidates found challenging were scaling graphs and plotting points with accuracy. Lines of best fit were often very poor.

Comments on individual questions/sections

Section A – Hypotheses and risk assessments

Most candidates were able to make a sensible hypothesis in each of the 9 tasks, which linked the independent and dependent variables. The exception to this was in the investigating the effect of glucose concentration task where many candidates failed to link the independent and dependent variables and instead just predicted that a colour change would occur. In producing risk assessments, the most successful candidates linked the risk with a particular action in the method, such as burning your hand if you touch a hot beaker and were able to suggest a sensible control measure for that risk. Less successful candidates often did not link the risk to an action, for example, stating simply that apparatus can burn you with no reference to either the action of touching or the affected body part. It was also very common for candidates to create a risk for experiments when there were no significant risks such as in the impact craters task.

Section A - Tables of results

Most candidates produced well-structured tables with all the data recorded. Whilst most candidates only include units in the table headings it was more common than in previous series to see units in the body of the table. The unit for hydrogen peroxide concentration (vol) did cause issues in one task. In the glucose task many candidates confused the heading, concentration, with the unit, percentage. Incorrect abbreviations of units (e.g. secs for s / seconds) was commonly seen. Candidates should be reminded that they should always calculate a mean from their repeats as they will not be prompted to do this. The conversion of time from minutes to seconds in the glucose task posed issues for a significant minority of candidates which then led to errors in graph plotting.

Section B – Variables

Each of the 9 tasks included a section on variables. Candidates were usually able to identify the independent and dependent variables, and most were able to state the range of these variables when required. Many of the tasks explored how certain variables were controlled, and in common with previous series this was not well answered, with no clear indication of the apparatus used or the required measurement of that variable. For example, in the glucose task candidates needed to identify that the volume of Benedict's solution was measured to be 2 cm³ with a pipette. In the impact craters task candidates were asked to explain why an identified controlled variable was controlled. This was poorly answered with many responses referring to making it fair, rather than focussing on the effect that this would have on the diameter of the impact crater.

Section B – Graphs

The most successful candidates obtained most of the available marks in this section. However, a significant number of candidates displayed very weak graph plotting skills, more so than in previous series.

Even where suitable scales were chosen, many candidates struggled with the accuracy of their plotting. Scales were also often poor with multiples of 3 commonly seen, these are not accepted. In tasks where the data range was narrow, candidates often did not truncate and this made plotting the data and then drawing of a suitable line of best fit difficult. Whilst candidates were not penalised for not truncating scales, there were numerous candidates who incorrectly truncated by not starting the scale with a suitable number and either omitted a zero on the y-axis or did not indicate truncation had taken place.

Lines of best fit continued to be problematic as many candidates simply joined the first and last point with no consideration of the spread of data above and below the line. Joining point-to-point is only usually acceptable in Biology tasks but this was seen commonly in all tasks.

In all tasks candidates are often asked to identify the relationship between the plotted variables and this was usually done well. Whilst most candidates were able to describe a relationship between the independent and dependent variables in the graph, a description of the shape of the graph, where it was required for the second mark, was poor.

Section B – Evaluation of results

In many of the tasks, candidates were asked to evaluate accuracy, validity of the experiment, closeness to the true value, repeatability and / or reproducibility of their results or given data. Whilst it is evident that the terminology is familiar and broadly understood, the clarity of candidates' responses often limited the marks attained. When considering repeatability candidates should make clear reference to the closeness of repeat readings; it was common to see vague responses referring to all the results being close which gained no credit. Of the candidates correctly referring to repeats, few went on to use the data to support their judgment.

When evaluating the reproducibility of given data in the glucose experiment, many candidates were able to recognise that the reproducibility was poor because the results were different between groups. Very few recognised that all groups had the same pattern in their results.

Section B - Improvements

Identifying inaccuracies and corresponding improvements was poorly done by many this year. Candidates should be encouraged to consider what they found difficult in carrying out an experiment and base their responses around this. In the glucose task, many suggested that the timing was inaccurate and considering using a stopwatch with a better resolution as an improvement, rather than describing how difficult it was to judge when the endpoint had been reached. Similarly, in the craters task many discussed the levelness of the sand which gained no credit.

Section B – Plans

Where tasks included a plan at the end, these were generally better answered than in previous years. In the electrolysis task most candidates attained marks for stating that the current would be measured and describing how the solution would be heated. In common with other plans, candidates did not always state at least 4 values of the independent variable or list at least two controlled variables.

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