

GCSE Examiners' Report

Applied Science (Double 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	<p>Grade boundaries are the minimum number of marks needed to achieve each grade.</p> <p>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.</p> <p>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.</p>	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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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, which was approximately 10% of the total entry for this qualification.

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. completion of a Sankey 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 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.

There was more success in QER questions this year, as no question required recall. However, some responses are very difficult to read, and many spelling and capitalisation errors were seen.

Questions that drew upon practical skills and understanding were answered inconsistently. Few candidates could recall methods for specified practicals, e.g. carrying out a flame test.

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 (DOUBLE 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 examines 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 generally good. 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.

In some question parts, candidates are asked to include data in their answer. Failure to do so often results in no marks being awarded. 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 complete a Sankey diagram. As a result, it did not have dotted lines to write an answer on. Too frequently, question parts such as this are not attempted. This has been commented on in previous reports.

Some questions that assessed mathematical skills were not well answered. Equations are given in the appropriate form in the question part. However, many candidates substitute incorrectly into given equations. Sometimes this was due to incorrectly selecting data from the wrong option or by not considering units. Another problematic area was the incorrect rounding of final answers. 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.

Graph work was poor.

The QER question did not require recall of knowledge but demanded interpretation of tabulated data. The facility factor was very low. Some responses are very difficult to read, and too many spelling and capitalisation errors are seen.

Comments on individual questions/sections

- Q.1** (a) There was much confusion linking the terms to their descriptions.
- (b) Mostly correct answers seen.
- Q.2** (a) (i) Very poorly answered. Most answers referred to breathing or oxygen. Just under 30% of candidates failed to attempt the question.
- (ii) The remaining product of respiration was known by about half of candidates.
- (b) Parts (i) and (iii) were answered very well. In part (ii), two marks indicates that something more was required than just a statement that the concentration of lactic acid increased. Some candidates failed to give that statement.
- Q.3** (a) It was rare to award three marks for labelling the diagram even though the labels were provided in a box. A common error was confusing the alveoli and bronchiole.
- (b) All three parts were 'tick a box' questions. Parts (i) and (ii) were rarely answered correctly.
- (c) Most candidates earned a mark here usually for inserting 0. Only a minority gained more credit. It was very rare to award four marks. Confusing nitrogen and oxygen was a common error. An unexpected gas was named in some cases. Parts of the lungs given in the box in part (a) were even named as gases. The number -4 appeared which just followed the number above and was incorrect.
- Q.4** All question parts were related to the solubility curves in the graph. Part (b)(i) was more successfully answered than the other parts.
- Q.5** Parts (a) and (b) were practically based. They were not answered well apart from (b)(ii) which was a tick box question.
- (c) The underlining in the first sentence was more often correct than in the second sentence.
- (d) Few candidates were able to state an advantage or disadvantage of bioplastics. The non-attempt rate was about 25%.
- Q.6** (a) Few candidates could provide an acceptable statement.
- (b) The majority of candidates completed the calculation correctly. However common errors were seen, i.e. incorrect substitution, rounding errors and using data for the old boiler.
- (c) Candidates lost marks for incorrect or missing labels and for inaccurate scaling. The non-attempt rate was about 20%.
- (d) Poor responses were seen. The non-attempt rate was about 25%.

- (e) Again, poor responses. Many candidates referred to the more efficient new boiler, but this was given in the question.
- Q.7** (a) The majority of candidates completed the calculation correctly. However common errors were seen, i.e. incorrect substitution and using data for other types of insulation. Some candidates lost marks for not showing workings.
- (b) This was poorly answered, and the non-attempt rate was about 20%. Many candidates did not include data in their answer despite the instruction in the question. Others selected one type of insulation only, but the question asked for types. The payback time was usually incorrect. Candidates just added the individual payback times for each method instead of dividing total cost by the total annual savings.
- Q.8** The mean mark was 1.1. The non-attempt rate was about 30%. The QER did not require recall of knowledge but was based on a table of data. Candidates had difficulty in describing trends and it was clear many could not understand negative numbers.
- Q.9** The majority of candidates scored at least half marks overall.
- Q.10** Not one part of this question had an attempt rate above 87%.
- (a) It was clear that candidates did not understand the term controlled variable so could not identify one.
- (b) (i) Candidates were unable to give an explanation based on the table of results.
- (ii) Few candidates earned full marks for plotting the graph. This was despite assessing only the plotting of points from 10 to 40 cm. Many errors were seen in adding the scale on the y-axis, usually for the scale being non-uniform. Candidates made errors in plotting points and when drawing a smooth curve.
- (iii) A minority of candidates were able to draw any conclusions based on the graph. About 30% of candidates did not attempt an answer.
- (iv) This was very poorly answered. The non-attempt rate was about 32%. Many candidates could not identify a pair of distances within the given range that showed doubling. Some candidates selected 10 and 20 cm together with the corresponding voltages. These concluded that Malcolm was correct. They did not consider doubling from 20 to 40 cm.
- (c) (i) & (ii) These calculations were mostly correct.
- (iii) Many candidates calculated to find that the energy would be insufficient to charge the phone but some failed to make a conclusion.

APPLIED SCIENCE (DOUBLE 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 degree of difficulty of questions increased throughout the paper, with questions in the common section providing the least challenge.

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

Sometimes a question part required candidates to include data in their answer. Failure to do so often resulted in no marks being awarded. 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 complete a Sankey diagram and another asked them to add a line to a graph. As a result, they did not have dotted lines to write an answer on. Too frequently, question parts such as these were not attempted. This has been commented on in previous reports.

The best answered questions on the paper were the calculations. All equations were given in the appropriate form in these question parts. However, many candidates substituted incorrectly into given equations. Sometimes this was due to incorrectly selecting data from the wrong option or by not consider units. Another problematic area was the incorrect rounding of final answers. 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. Some candidates failed to give an answer to three significant figures.

Many candidates found the graph plotting difficult.

The QER question did not require recall of knowledge but demanded interpretation of tabulated data. The facility factor was very low. Some responses were very difficult to read.

Comments on individual questions/sections

- Q.1**
- (a) It was clear that many candidates did not understand the term controlled variable so could not identify one.
 - (b)
 - (i) Most candidates were unable to give an explanation based on the table of results.
 - (ii) About half of candidates earned full marks for plotting the graph. Many of the remaining candidates made errors in adding the scale on the y-axis, usually because the scale was non-uniform. Also, candidates made errors in plotting points and when drawing a smooth curve.

- (iii) About half of candidates were able to draw a conclusion based on the graph.
 - (iv) This was poorly answered. The non-attempt rate was about 14%. Many candidates could not identify a pair of distances within the given range that showed doubling. Some candidates selected 10 and 20 cm together with the corresponding voltages. These concluded that Malcolm was correct. They did not consider doubling from 20 to 40 cm.
- (c) (i) & (ii) These calculations were mostly correct.
- (iii) Many candidates calculated to find that the energy would be insufficient to charge the phone but not all made a conclusion. Those that did came up with a variety of conclusions, e.g. the phone was only 41% charged, another 5.32 Wh is needed, and it would take 2.4 days to charge fully. Candidates who failed to use the given equation correctly, used various combinations of the numbers provided in the question. For example, a power was multiplied by an energy value. This demonstrated a lack of understanding of units.

Q.2 At least 10% of candidates failed to attempt these question parts.

- (a) & (b) Both question parts required recall of knowledge and were poorly answered. The roles of the gall bladder and pancreas were known by few candidates.
- (c) (i) This was not answered well. The comparison of the two proteases should have included pH values but this was unusual. Many candidates referred to either protease A being acidic or protease B being alkaline. This was a common error.
- (ii) This part also required recall and was very poorly answered. It was rare to award a mark.

- Q.3**
- (a) About half of candidates could successfully label the respiratory system diagram. The spelling of bronchus/bronchi and bronchiole(s) had to be correct. This meant some candidates lost a mark or two.
 - (b) (i) This was another recall question, and a minority of candidates were awarded any credit. It was rare to see an answer worthy of full marks. Most candidates were confused about the changes in the diaphragm and intercostal muscles. Others just reworded the question as their answer.
 - (ii) The question asked for an explanation of the differences between air breathed in and air breathed out. Only a minority of candidates were able to do this. There were references to nitrogen and other gases not changing. This was not required and it made no difference to the mark. This is an exam technique issue in understanding what a question is asking.

- Q.4** (a) About 18% of candidates did not attempt the question. It is clear question parts not followed by dotted lines are ignored by a significant number of candidates. Most of the remainder completed the table correctly.
- (b) A small minority of candidates could explain the best way for the house to be insulated within the budget. Most answers did not include any of the data so failed to achieve any credit.

- Q.5** (a) No correct answers seen.
- (b) The majority of candidates completed the required calculations correctly. Some candidates lost the answer mark due to incorrect rounding or failing to give the answer to three significant figures. Other candidates failed to determine the temperature rise.

Notice the manner in which values are substituted into the equation below. This is becoming more common and it is not recommended that candidates use this method.

$$\text{energy to heat water (J)} = \text{temperature rise (}^{\circ}\text{C)} \times 840$$

$\frac{50400}{\dots}$
 $\frac{60.0}{\dots}$

- (c) Very poor responses. Rare for a mark to be awarded.
- (d) The majority of candidates calculated the useful energy correctly in part (i) but few completed the Sankey diagram correctly in part (ii). Almost 40% of candidates failed to attempt to complete it.
- Q.6** (a) (i) Two marks indicated that something more is required than just a statement that the concentration of lactic acid increases. Most candidates failed to give that statement.
- (ii) & (iii) Very poor responses seen.
- (b) Most of the candidates who attempted the question added a suitable line. However, the non-attempt rate was about 16%.
- Q.7** Very poor responses seen to this QER question. Also, the non-attempt rate was 28%. Many accounts suggested making all the fractions equal without giving any details how this could be achieved.
- Q.8** (a) This question was based on a practical. Very few candidates were able to explain how steps 2 & 4 made the experiment safe.
- (b) A minority of candidates were able to describe advantages and disadvantages.

APPLIED SCIENCE (DOUBLE AWARD)

GCSE

Summer 2025

UNIT 2: 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 examines 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, some aided recall of knowledge but others did not. 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 but not all. 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 recall questions tended to be poor. This is nothing new and has been commented on in exam reports for several series.

In some question parts, candidates are asked to include data in their answer. Failure to do so often resulted in no marks being awarded. 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 complete a table, another asked them to complete a diagram. As a result, they did not have dotted lines to write an answer on. Too frequently, question parts such as this are not attempted. This had been commented on in previous reports.

Some questions that assessed mathematical skills were not well attempted. Equations are given in the appropriate form in the question part. However, many candidates substituted incorrectly into given equations. They did not consider units during the substitution process. Errors were seen in simple multiplications. Another problematic area was the incorrect rounding of final answers. 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. Many candidates did not know how to calculate the area of a square or rectangle.

The QER question did not require recall of knowledge. The mean mark just edged into the middle band. Some responses were very difficult to read, and too many spelling and capitalisation errors were seen.

The pre-release was based on the theme of space. There were 25 marks based on this resource, 19 of which were common to both tiers of papers. This year, questions worth 2 marks depended on recall. As usual, teachers within centres are free to use the resource to prepare candidates for the examination. It is assumed that teachers take the time to read through the material with candidates, clarifying any queries that arise.

Comments on individual questions/sections

- Q.1** (a) Most candidates were able to select the correct resources.
- (b) This question was based on fieldwork using quadrats. It was heavily scaffolded.
- Even so responses were poor. The not attempt rate varied between 23% and 34% for each parts. Many candidates did not know how to work out area of squares and rectangles. Some divided the length of the sides instead of finding their product while others added them. Whenever an ecf applied there was incorrect rounding which always loses the answer mark. Part 1(b)(ii) was least well answered. Candidates did not understand how to calculate the population in the field from the mean number per quadrat and field area.
- Q.2** All question parts were objective style and attempt rates and mean marks were very good.
- Q.3** (a) Most candidates had poor knowledge of joints and their locations in the body.
- (b) Many candidates were able to underline some correct word(s) in the given sentences. About half of candidates achieved 3 marks. The most common errors were in identifying the technique used to form images of soft tissues and identifying the blood part that forms clots.
- Q.4** (a) Only a minority of candidates were able to complete the Punnett square correctly. Many candidates determined an incorrect genotype for the second parent. However an ecf mark was awarded for the resulting cross combinations. Others showed a double allele for the second parent. In this situation no marks are awarded for the parent or cross. It is likely the question was misread by some candidates since the % chance matched with children born without the faulty allele.
- (b) Many candidates calculated height² by working out height + height. There were substitution errors in the BMI equation and when working out height². Candidates are encouraged to show workings out when making calculations.
- (c) Generally well done.
- Q.5** All question parts required recall of knowledge and as a result were poorly answered.
- Non-attempt rates rose from 15% to 33% between parts (a) and (d). The mean mark declined from (a) to (d) with the exception of part (c) being answered least well.
- Q.6** The QER question was based on two graphs and did not require recall of knowledge. Candidates were required to describe how speed changed with time along regions A, B, C and D in the top graph and then to use the second graph to describe how heart rate changed in the same regions. They were asked to include data from both graphs in their response. The mean mark just edged into the middle band. Some excellent responses were seen but in a minority of cases. A minority of candidates understood how to link heart rate changes with speed applied to the regions mentioned previously.

Some candidates mistook the heart rate/speed graph for heart rate/time. Others failed to include any relevant data in their descriptions so were limited to bottom band marks.

Some responses are very difficult to read, and many spelling and capitalisation errors were seen.

- Q.7** This was the FT only question based on the pre-release. About 40% of candidates failed to complete the diagram in part (a). Few of those who completed it earned the mark. In (b), many candidates ignored the instruction to write yes or no in every cell. An incomplete row did not earn any credit.
- Q.8** This question was common to FT and HT. On this paper, about 30% of candidates failed to attempt the question parts. It was very rare to see a correct unit in (a). Candidates usually wrote down ly. The conversion proved too difficult for FT candidates.
- Q.9** This question was common to both tiers. It was entirely based on the pre-release. All question parts directed candidates to the relevant section of the article. They all required interpretation of information apart from 2 marks which required recall. The facility factors of parts 9(c), 9(e)(i) and 9(e)(iii) were encouraging but all other parts were low, ranging from about 32% to 16%. Not-attempt rates varied from about 15% to 35%. One calculation was required, and the equation was provided in the form to be used. Too many candidates persist in just writing their answer on the line without showing any workings. This is a dangerous strategy since no marks can be awarded in the case of incorrect answers. Also, when an ecf applied, marks were lost for incorrect rounding at the final answer stage. Questions (b) and (d), asked candidates to evaluate data to reach a conclusion. Many candidates ignored the instruction to include data in their responses. In both parts, there was evidence of candidates selecting data incorrectly. Few candidates could identify the gases present from a series of absorption spectra. However more success was achieved using another group of spectra to arrange the galaxies in the order specified. Questions must be read with more care.

APPLIED SCIENCE (DOUBLE AWARD)

GCSE

Summer 2025

UNIT 2: 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 examines topics from the three science disciplines offered in the science suite.

The paper was of comparable demand 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.

The performance of candidates in recall questions that required descriptions and/or explanations tended to be less well answered than those requiring very little knowledge. This is nothing new and has been commented on in exam reports for several series. Where candidates demonstrated some knowledge and understanding, many answers were vague or confused and sometimes did not relate exactly to the question asked.

In some question parts, candidates were asked to include data in their answer. Failure to do so often resulted in no marks being awarded. 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 complete a diagram. As a result, it did not have dotted lines to write an answer on. Too frequently, question parts such as this are not attempted. This had been commented on in previous reports.

Some questions that assessed mathematical skills were not well attempted. Equations are given in the question parts. However, too many candidates substitute incorrectly into given equations. They do not consider units during the substitution process. Errors in rearranging equations were seen. Another problematic area was the incorrect rounding of final answers. 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. Some candidates did not know how to calculate the area of a square or rectangle and errors were seen when squaring a number.

The QER question did not require recall of knowledge. The mean mark was in the middle band. Some responses were very difficult to read, and spelling and capitalisation errors were seen even on HT.

The pre-release was based on the theme of space. There were 25 marks based on this resource, 19 of which were common to both tiers of papers. This year, questions worth 2 marks depended on recall. As usual, teachers within centres were free to use the resource to prepare candidates for the examination. It is assumed that teachers take the time to read through the material with candidates, clarifying any queries that arise.

Comments on individual questions/sections

- Q.1** This question was common to FT and HT. On this paper, about 12% of candidates failed to attempt the question parts. It was very rare to see a correct unit in (a). Candidates usually wrote down ly. The conversion was successfully completed by about half of candidates.
- Q.2** This question was common to both tiers. It was entirely based on the pre-release. All question parts directed candidates to the relevant section of the article. They all required interpretation of information apart from 2 marks which required recall. The facility factors were encouraging, ranging from about 57% to 83% except in one question part. Attempt rates for all parts were above 92% One calculation was required, and the equation was provided in the form to be used. This was the best answered part of question 2. Many candidates persist in just writing their answer on the line without showing any workings. This is a dangerous strategy since no marks can be awarded in the case of incorrect answers. Some candidates made an error in copying the number of zeros on the answer line while others made unnecessary conversions. After substituting values into the equation correctly a few candidates multiplied the values rather than dividing. Questions (b) and (d), asked candidates to evaluate data to reach a conclusion. Too many candidates ignored the instruction to include data in their responses. In both parts, there was evidence of candidates selecting data incorrectly. Most candidates included a conclusion in these types of questions. Over half of candidates could identify the gases present from a series of absorption spectra. Even more success was achieved using another group of spectra to arrange the galaxies in the order specified.
- Q.3**
- (a) Candidates were required to add to the diagram but this part was one of the highest non attempt rates on the paper. Careful reading of questions is required. Just under half of candidates completed the diagram correctly.
 - (b)
 - (i) The term matter was accepted to correlate with mass. About half of candidates were able to address the question by including details about whether matter is still being created according to both theories of the origin of the Universe. They were also able to describe the effects on density. Others answered their own question and ignored the requirement to include details about mass and density.
 - (ii) Knowledge of CMBR was very poor. It was very rare to award a mark. Also, about 24% of candidates failed to attempt the question.
- Q.4** This question required recall of knowledge in all parts. Performance across the parts was varied.
- (a) Knowledge of joints and their locations within the body was poor.
 - (b) Few candidates recognised the type of fracture in the illustration but over 90% identified the part of the em spectrum used to take the image. Less than half of candidates could identify an imagine technique used to form images of soft tissues.
 - (c) There was confusion about the part of the blood responsible for clotting and the purpose and action of antibiotics was not well known.

- Q.5** This QER was based on an Arctic food web. It required application of knowledge. The attempt rate was about 98%. The mean mark was in the middle band. There was not just one correct answer to the question. There were direct effects of declining cod numbers and these developed into indirect effects on the wider population. Answers were seen covering all bands of marks. It was a pleasure to read top band answers. These candidates were able to describe comprehensively how interlinked food chains were affected. Middle band answers tended to describe effects on multiple numbers of living things but lacked detail about population changes. Bottom band answers were limited to the effects on 1 or 2 organisms. It was clear that some candidates were not aware of the importance of the arrows linking living things.
- Q.6** All parts of this question required recall of knowledge. Parts (b) and (c) were answered very poorly with few marks being awarded. Candidates appeared unaware of the term heavy metals. They had poor knowledge of the effects of fertilisers and untreated sewage on rivers. There was a slight increase in the mean mark for part (d). Although part (a) was the best answered part, less than half of candidates earned anything more than a mark.
- Q.7**
- (a) The majority of candidates earned full credit here.
 - (b)
 - (i) Less than half of candidates arrived at a correct answer. Errors were seen in squaring the height and some candidates did not even attempt to and just used the height. Some candidates were unable to rearrange the equation correctly. On too many occasions no workings were shown and an answer just appeared on the answer line. If this was incorrect then it is very likely zero marks were awarded. Some candidates worked out h^2 and ended at that point.
 - (b)(ii) & (c) These were generally well answered.
- Q.8**
- (a)
 - (i) Most candidates were able to name two resources.
 - (ii) Mostly correct answers seen.
 - (b) This question was based on fieldwork using quadrats.
 - (i) This was a novel way of presenting data and just under half of candidates completed all cells correctly. It was unclear how some of the inserted values arose.
 - (ii) This was a multistage calculation that required use of data in the text of the question and from the table. Few candidates earned any credit. Even then it was partial credit for completing one of the stages correctly. Many candidates did not know how to work out area of squares and rectangles. There were many examples of adding together numbers in the different columns only to arrive at the final running total.
 - (iii) Only a minority could identify the quadrat number and less could give a reason.
 - (iv) This was very poorly answered.

APPLIED SCIENCE (DOUBLE AWARD)

GCSE

Summer 2025

UNIT 3: 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.

The demand of the early questions was less than in previous series due to an increase in objective style questions and straightforward calculations. 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 early objective style question parts were generally well attempted. This style of questioning, especially those requiring recall of knowledge, made them more accessible to candidates. However, many candidates lacked the basic knowledge and understanding of the topics assessed through these questions and probably made random guesses. There were also those candidates who, through failing to read the question properly, did not follow instructions so selected more answers than required e.g. ticking only 2 boxes or selecting more than 3.

The performance of candidates in recall questions, particularly those that required descriptions and/or explanations tended to be poorly answered. This is nothing new and has been commented on in exam reports for several series. This was particularly evident in questions relating to practical work. For example, many candidates could not describe how to carry out a flame test. In some question parts, e.g. 4(b), candidates were asked to use data in their answer. Failure to do so often resulted in no marks being awarded. Where candidates demonstrated some knowledge and understanding, many answers were vague or confused and sometimes did not relate exactly to the question asked.

Questions that assessed mathematical skills were generally well attempted. Equations were given in the appropriate form in the question part. However, too many candidates substituted incorrectly into given equations and sometimes ignored the maths symbols that were given. They did not consider units during the substitution process. It is also expected that candidates are able to calculate a mean or percentage without being given an equation. Another problematic area was the incorrect rounding of final answers. 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 quality of graph work was inconsistent. The majority of candidates were able to successfully plot points onto the grid but there remains a group of students who interpret the axes correctly to plot early points successfully, but, whether due to lack of concentration or other reasons, fail to achieve this for later plots. Only a minority were able to add a best fit curve.

Comments on individual questions/sections

- Q.1** This was an objective style question and was answered well by most candidates. However candidates must adhere to the instructions in the question. In part (b), some candidates ticked only 2 boxes and others ticked more than 3.
- Q.2** (a) The majority of candidates achieved well in these calculations. The importance of showing workings must be emphasised. When an answer is incorrect, the examiner can see from the workings whether the candidate has substituted correctly into an equation so a mark can be awarded. Without this working the candidate is likely to score zero. Errors included the following:
- cubing the value in front of the unit g/cm^3
 - adding the values in the given volume equation rather than multiplying
 - calculator errors when dividing.
- (b) Candidates did not achieve as much success in these calculations compared with part (a). The attempt rate was also lower. The main source of error was failure to square the radius.
- Q.3** (a) (i) Most candidates were able to gain some success in plotting the points. The most common error was plotting the 50,24 point. A minority of candidates were able to draw a smooth curve through the points.
- (ii) Mostly correct answers seen.
- (b) The attempt rate dropped for here. Less than half of candidates gained credit.
- (c) Part (i) was answered more successfully than part (ii). About half of candidates failed to calculate a percentage.
- (d) Most candidates interacted with the diagram to name leaf parts in parts (i) and (ii). However there was less success in part (iii) in completing the photosynthesis equation since this depended on recall.
- Q.4** (a) Most candidates failed to identify controlled variables.
- (b) A full range of marks was awarded here. For a top band answer, use of the graph to give a detailed comparison of the reactions was made together with data from the graph. Recognition that the reaction was completed at 35s with manganese(IV) oxide was also included. Answers of this quality were rare to see. It was more common to see a limited comparison with no data. Some responses were very difficult to read, and too many spelling and capitalisation errors were seen.
- (c) Very few candidates gave a correct mass here. Most did not know the mass of a catalyst does not change during a reaction. Also, over 25% non-attempt rate.
- Q.5** (a) (i) The equation to be completed was represented diagrammatically. Despite this, answers were generally poor.
- (ii) Knowledge of this topic was poor.

- (b) Most candidates interacted well with the graph to score well here. Others ignored the instructions in the question to place 2 ticks in each row.
 - (c) Most candidates understood the concept or spotted the numerical patterns to earn both marks here. Candidates were less successful in determining the year when the region would become safe. Lots of answers were 210 years which was the last time value in the table. The year 1986 quoted in the question went largely unnoticed.
- Q.6**
- (a)&(b) These questions required recall of knowledge and were very poorly answered. The attempt rates were among the lowest on the paper.
 - (c) Most candidates attempted both parts here. However, their reasoning was generally poor or not comparative.
- Q.7**
- (a)
 - (i) Descriptions of how to carry out a flame test were very poor.
 - (ii) Knowledge of metals and their flame colours was also poor.
 - (b) Very rare to see a correct answer.
 - (c)
 - (i) A minority were able to use the information to name powders.
 - (ii) It was clear candidates did not know the difference between these two types of tests.
- Q.8**
- (a) & (b) A minority of candidates could describe the relationships asked for.
 - (c) Mostly poor responses here. Candidates were unable to use the data to give the required analysis. The majority of responses did not include any data. Very few correct responses seen.
 - (d) Most candidates could not handle the mean data provided to answer the question. Almost 40% of candidates failed to attempt the question.

APPLIED SCIENCE (DOUBLE AWARD)

GCSE

Summer 2025

UNIT 3: 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 of comparable demand 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.

The performance of candidates in recall questions that required descriptions and/or explanations tended to be less well answered than those requiring very little knowledge e.g. 4(c), 5(a)(ii) and 5(c). This is nothing new and has been commented on in exam reports for several series. This was particularly evident in questions relating to practical work. In some question parts, candidates were asked to include data or use the graph in their answers, e.g. 2(c). Failure to do so often resulted in no marks being awarded. Where candidates demonstrated some knowledge and understanding, many answers were vague or confused and sometimes did not relate exactly to the question asked.

Questions that assessed mathematical skills where equations were given in the appropriate form were generally well attempted with some candidates gaining full marks e.g. 4(b). However, too many candidates substituted incorrectly into given equations. They did not consider units during the substitution process. Sometimes maths symbols were ignored. It is expected that candidates are able to perform a calculation involving means, e.g. 2(d). Errors were seen in simple arithmetic. Another problematic area was the incorrect rounding of final answers. 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 quality of graph work was still inconsistent. Candidates were expected to add scales to a grid in question 6(b)(i). Some candidates were unable to produce a linear scale from the tabulated data. A majority of candidates were able to successfully plot points onto the grid and most of these were able to add a best fit curve.

Sometimes a question part will ask candidates to add to a diagram or graph. These types of questions were often ignored e.g. 6(b)(i)l.

Comments on individual questions/sections

- Q.1** (a) (i) Descriptions of how to carry out a flame test were often incomplete.
(ii) Knowledge of metals and their flame colours was poor.
- (b) Very rare to see a correct answer.
- (c) (i) A majority were able to use the information to name powders.
(ii) It was clear most candidates did not know the difference between these two types of tests.
- Q.2** (a) & (b) About half of candidates could describe the relationships asked for.
- (c) Mostly poor responses here. Candidates were unable to use the data to give the required analysis. Some responses did not include any data.
- (d) Most candidates could not handle the mean provided to answer the question.
- Q.3** (a) The majority of candidates earned at least 2 marks here. Marks were lost for specific points about three of the methods not being given. A general statement that the method kills bacteria was only acceptable for heating.
- (b) This part was not answered well. Candidates referred to hygiene in their answers despite the question asking for **other** methods.
- Q.4** (a) The majority of candidates achieved well in these calculations although performance declined from part (i) to part (iii). The importance of showing workings must be emphasised. When an answer is incorrect, the examiner can see from the workings whether the candidate has substituted correctly into an equation so a mark can awarded. Without this working the candidate is likely to score zero.
- (b) The majority of candidates achieved well in these calculations. The main sources of error were failure to determine and/or square the radius.
- (c) Knowledge of this content was poor. It was rare to award a mark. If a mark was awarded it was usually for a reference to the layered structure.
- Q.5** (a) (i) The equation to be completed was represented diagrammatically. Despite this, less than half of candidates earned credit.
(ii) Knowledge of this topic was poor.
- (b) Few candidates interacted well with the graph to score any marks here. Some just described how energy released varied across the regions. This did not answer the question.
- (c) (i) This question was answered very poorly.

- (ii) A minority of candidates scored well in this calculation. Often the sequence of halving was incorrect. Many candidates failed to determine the year when the region would become safe. Lots of answers were 210 years which was the value determined in the first stage of the calculation. The year 1986 quoted in the question went largely unnoticed.

Q.6 (a) Mostly responses of a lower band quality were seen. Candidates had more success in comparing the reactions than explaining the differences in terms of variables.

- (b) (i) The quality of graph work was still inconsistent. Some candidates were unable to produce a linear scale from the tabulated data. A majority of candidates were able to successfully plot points onto the grid and most of these were able to add a best fit curve.

- (ii) I. This question was often ignored.
- II. Few candidates could explain the effect of a catalyst.
- III. Less than half of candidates knew the mass of the catalyst would not change.
- IV. Very poorly answered.

Q.7 (a) Knowledge of the term limiting factor was poor. It was very rare to award a mark.

- (b) & (c) More candidates were able to identify the limiting factor in each of these parts than give a reason for their answers.

APPLIED SCIENCE (DOUBLE AWARD)

GCSE

Summer 2025

UNIT 4: 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: Scientific detection; Underpinning energy concepts; and The cell and respiration.
- Pack B tested candidates' ability within the topics of: Underpinning energy concepts; Transfer and recycling of nutrients; and Scientific detection.
- 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 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 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 B.
- 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.

Task B – Collecting and recording

- This section continues to be high scoring.
- Many candidates omitted to write the resolution of their electronic balance (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 mass of the empty crucible and the mass of the crucible plus the magnesium oxide. A significant minority of candidates also measured and recorded the mass of the different lengths of magnesium, which was not required, and potentially confused themselves.
- 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, particularly with Pack A. 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/charts. 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 the mass data produced in Pack A, sometimes gave much more of a challenge.
- Both packs required candidates to extract information from their graph. Many candidates attempting Pack A were unable to extrapolate their graph, or use the table of data to estimate the mass of magnesium oxide produced by a piece of magnesium 30 cm long, although most wrote the unit correctly. Most candidates attempting Pack B were able to correctly read a value from their graph, and were able to correctly draw the second line for the more efficient ball. 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 both packs were able to perform the calculations given.

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 still need to be more aware of the meaning of repeatability. Pack B asked candidates to assess the repeatability of their data and a significant minority still referred to all their data being similar, when they should be focusing on the similarity of their repeated data values. Many candidates did not subsequently refer to using repeated values to calculate a mean value. Pack A asked candidates why the crucible lid was lifted every 30s during heating and most candidates gave a creditworthy response.
- Candidates were better at spotting inaccuracies and suggesting improvements, although extensions to an investigation were not considered to be improvements.
- Many candidates found explaining the suggestion/agreement question at the end of this section in both packs a challenge. Candidates should take more time reading this question, and thinking 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 a considerable issue, with only relatively few successfully producing a scale that filled over half of the plottable area and included a suitable value for the origin on the y-axis. Having said this, a significant majority of candidates then plotted their values correctly, within the tolerance of less than one small square, however, 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 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, and were able to match the correct seed to its dispersal method for Pack B correctly. 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 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 were able to suggest human error as the biggest uncertainty but only a minority were able to link the human error to either measuring the bounce height of the fast-moving ball or coordinating releasing the cup-cake case and starting/stopping the stopwatch.
- Only a minority of candidates gained any credit for the suggestion/agreement question at the end. Only a minority identified the range being too small for the game of table-tennis 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, but did not agree with Sian in either case.

Activity 3

- 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.
- Please ensure that candidates know that:
 - Hazards require the specific nature of the hazard to be stated (e.g. Solid potassium manganate(VII) is harmful and oxidising; kitchen bleach is corrosive) – the specific nature is lifted straight off the Student Safety Sheet. Please note, candidates should always state the concentration of solutions if it is given, as this determines the level of the nature of the hazard.
 - Risks must have an injury and an action (e.g. blade/knife could cut hand /skin whilst cutting up the red cabbage). A significant minority of candidates correctly identified the relevant injuries, but did not state the action. Please keep candidates aware that some identified Hazards, are now classified as ‘currently not classified as hazardous’, replacing the ‘low hazard’ description on previous versions of the Student Safety Sheets. In this case, ‘no specific risk’ and ‘no specific control measures’ are appropriate responses. Risks must be related to the hazard.
 - Control measures need to be appropriate for the stated Hazard and Risk, e.g. when handling hot apparatus, gloves need to be stated as heat-proof. Some control measures are specified on the relevant Student Safety Sheet. (e.g. only handle, or perform experiments, in a fume cupboard).

APPLIED SCIENCE (DOUBLE AWARD)

GCSE

Summer 2025

UNIT 4: 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: Scientific detection; Underpinning energy concepts; and The cell and respiration.
- Pack B tested candidate's ability within the topics of: Underpinning energy concepts; Transfer and recycling of nutrients; and Scientific detection.
- 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.
- 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 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.
- 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.

Task B – Collecting and recording

- This section continues to be high scoring.
- Many candidates omitted to write the resolution of their electronic balance (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 take the required mass measurements, but these were frequently laid out poorly or confused. Most candidates were able to come up with a measurement for the mass of magnesium and a measurement of the mass of magnesium oxide.
- 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, particularly with Pack A. 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 do 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 the mass data produced in Pack A, sometimes gave much more of a challenge.
- Both packs required candidates to extract information from their graph. Many candidates attempting Pack A were unable to extrapolate their graph, or use the table of data to estimate the mass of magnesium and magnesium oxide involved with heating a piece of magnesium 30 cm long. Most candidates attempting Pack B were able to correctly read a value from their graph, and were able to correctly draw the second line for the more efficient ball. 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 A were able to perform the calculations to determine the formula of magnesium oxide. Some candidates doing Pack B, found the

calculation more challenging as they confused the values of the coefficient of restitution and its square or they did not rearrange the equation correctly.

Task D – Evaluation

- As still continues to be the pattern, candidates find the evaluation component of any task hard.
- The lack of structured answers on the Higher Tier caused some issues for some candidates as they neglected to answer one or more of the bullet points.
- 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 still need to be more aware of the meaning of repeatability. Pack B asked candidates to assess the repeatability of their data and a significant minority are still referring 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. Pack A asked candidates why the crucible lid was lifted every 30s during heating and most candidates gave a creditworthy response.
- 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 a considerable issue, with only relatively few successfully producing a scale that filled over half of the plottable area and included a suitable value for the origin on the y-axis. Having said this, a significant majority of candidates then plotted their values correctly, within the tolerance of less than one small square, however, 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 calculation for Pack A straightforward, but many candidates doing Pack B found the calculation challenging, particularly with rearranging the equation or with rounding their answer.
- 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 doing Pack A were able to correctly identify that the ball was suitable for international competition and although they could draw in a correct line B on the graph, they sometimes struggled to explain why they had drawn the line where it was. For Pack B, most candidates were able to match the correct seed to its dispersal method correctly but explaining why dandelions generally disperse their seeds away

from the parent plant in dry air proved much more of an issue, and many did not make any reference to the two photographs given.

Task B – Evaluation

- As has been the case historically, candidates still find evaluations very challenging.
- As with Activity 1 Task D, the lack of structured answers on the Higher Tier caused some issues for some candidates as they neglected to answer one or more of the bullet points.
- 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 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 were able to suggest human error as the biggest uncertainty but only a minority were able to link the human error to either measuring the bounce height of the fast-moving ball or coordinating releasing the cupcake case and starting/stopping the stopwatch.
- Only a minority of candidates gained any credit for the suggestion/agreement question at the end. Only a minority identified the range being too small for the game of table-tennis 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, but did not agree with Sian in either case.

Activity 3

- 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.
- Please ensure that candidates know that:
 - Hazards require the specific nature of the hazard to be stated (e.g. Solid potassium manganate(VII) is harmful and oxidising; kitchen bleach is corrosive) – the specific nature is lifted straight off the Student Safety Sheet. Please note, candidates should always state the concentration of solutions if it is given, as this determines the level of the nature of the hazard.
 - Risks must have an injury and an action (e.g. blade/knife could cut hand /skin whilst cutting up the red cabbage). A significant minority of candidates correctly identified the relevant injuries, but did not state the action. Please keep candidates aware that some identified Hazards are now classified as 'currently not classified as hazardous', replacing the 'low hazard' description on previous versions of the Student Safety Sheets. In this case, 'no specific risk' and 'no specific control measures' are appropriate responses. Risks must be related to the hazard.
 - Control measures need to be appropriate for the stated Hazard and Risk, e.g. when handling hot apparatus, gloves need to be stated as heat-proof. Some control measures are specified on the relevant Student Safety Sheet. (e.g. only handle, or perform experiments, in a fume cupboard).

APPLIED SCIENCE (DOUBLE AWARD)

GCSE

Summer 2025

UNIT 5: 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.

Supporting you

Useful contacts and links

Our friendly subject team is on hand to support you between 8.30am and 5.00pm, Monday to Friday.

Tel: 029 2240 4252

Email: science@wjec.co.uk

Qualification webpage: [GCSE Applied Science \(Double Award\)](#)

See other useful contacts here: [Useful Contacts | WJEC](#)

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