

## Additional Applied Science – Controlled Assessment Exemplar commentary

### Marking information – Assignment 2: How scientists use evidence to solve problems – Fruit Juice Investigation

Work should be marked in **red**.

Whenever you give a mark, put the appropriate mark on the page next to the place where the candidate has gained that mark. Annotate the work to explain the marking.

It will help moderation if you attach the assessment grid, or the Marking Checklist, to each candidate's work, with the criteria awarded indicated with a tick.

Take a holistic view when deciding on the mark to award each strand. To do this, first review the work to see if it fits the criteria for Level 2:

- If the work **does** fit the criteria for Level 2 then look at the Level 3 criteria and award marks accordingly.
- If the work does **not** fit the Level 2 criteria then look at and award the appropriate Level 1 marks.

Marking should be completed using a 'best fit approach'. There is no compensatory marking or rules on the completion of one box before moving to another etc.

In strands where the Quality of Written Communication is specifically reviewed (1, 3 and 6), if the work does not match the criteria given in a level then the maximum mark for that level must **not** be given, even if all the mark points have been matched.

Put the final marks on the Candidate Record form.

Strand	0 marks	Level 1	Level 2	Level 3
<b>1. Planning</b>	No plan presented	<p><b>1.1a</b> The plan devised is basic, stating the purpose of the investigation (<b>mark point</b>)</p> <p><b>1.1b</b> and including some of the equipment needed (<b>mark point</b>),</p> <p>But overall lacks a coherent structure.</p>	<p><b>1.2a</b> The plan devised states the purpose of the investigation (<b>mark point</b>)</p> <p><b>1.2b</b> and includes the equipment needed (<b>mark point</b>).</p> <p>It shows some organisation and structure and is clear enough for another person to follow to collect appropriate data, although there may be some errors.</p>	<p><b>1.3a</b> The plan devised clearly states the purpose of the investigation (<b>mark point</b>)</p> <p><b>1.3b</b> and includes precise details of all the equipment needed (<b>mark point</b>).</p> <p>It is logically organised, clearly written and well structured in a series of ordered steps that could easily be followed by another person.</p>
		<p>Both mark points are achieved here as the detail given in the plan and about the equipment needed is above what is required here (<b>2 marks</b>).</p> <p>The structure of the plan is clearly of a logical standard above this level.</p>	<p>Both mark points are achieved here as the detail given in the plan and about the equipment needed is above what is required here (<b>2 marks</b>).</p> <p>The structure of the plan is above the standard required here.</p>	<p>The candidate has stated the purpose of the investigation in the introduction (pages 1 and 2), and then further elaborated on this in the individual plans (pages 3, 6, 8, 10 and 14) (<b>1 mark</b>).</p> <p>Details of equipment are given for each individual plan. Although some of the precision is shown in the method, it is preferred that this goes in the equipment list. (<b>1 mark</b>)</p> <p>Plans are presented in steps that are clear and can be followed by another person.</p>

**Total marks for this candidate for strand 1: 6 marks**

**Maximum marks for Strand 1: 6 marks**

### Additional Applied Science – Controlled Assessment Exemplar commentary

Strand	0 marks	Level 1	Level 2	Level 3
<b>2. Assessing and managing risk</b>	No evidence of risks having been identified	<p><b>2.1a</b> There is only a basic attempt at risk assessment (<b>mark point</b>)</p> <p><b>2.1b</b> and only brief references to health and safety practices (<b>mark point</b>).</p>	<p><b>2.2a</b> Most of the relevant hazards involved with the investigation have been identified (<b>mark point</b>)</p> <p><b>2.2b</b> together with associated risks (<b>mark point</b>).</p> <p><b>2.2c</b> Control measures to reduce the risks identified have been suggested, although these may be based on a common-sense approach rather than on any scientific reasoning (<b>mark point</b>).</p>	<p><b>2.3a</b> The relevant hazards involved with the investigation have been identified (<b>mark point</b>),</p> <p><b>2.3b</b> together with the appropriate associated risks (<b>mark point</b>).</p> <p><b>2.3c</b> Control measures that are firmly based on scientific reasoning to reduce the risks identified have been suggested (<b>mark point</b>).</p>
		Both mark points are achieved here as the risk assessment and health and safety practices mentioned are above this level ( <b>2 marks</b> ).	<p>The hazards involved in each of the practical techniques have been identified (<b>1 mark</b>).</p> <p>The associated risks are in the same column in the risk assessment tables e.g. 'broken glass can cut' is in the hazards column and risk just says 'low risk'. This should say hazard 'glass can break' and risk 'can cut you'. This mark point is not achieved.</p> <p>The control measures are very simple e.g. 'wear safety goggles' and based on common sense (<b>1 mark</b>).</p>	<p>Not all hazards involved with the investigation have been identified. An example of this is that in the risk assessment for testing for sugar using Benedict's solution, there is no mention of the water bath. This mark is not achieved.</p> <p>The risk mark was not achieved at level 2.</p> <p>The control measures show no scientific reasoning so this mark point is not achieved.</p>
<p><b>Total marks for this candidate for strand 2: 4 marks</b></p> <p><b>Maximum marks for Strand 2: 8 marks</b></p>				

### Additional Applied Science – Controlled Assessment Exemplar commentary

Strand	0 marks	Level 1	Level 2	Level 3
<b>3. Collecting data / evidence</b>	No data collected or results presented	<p><b>3.1a</b> Basic observations have been made from first-hand evidence obtained during the investigation <b>(mark point)</b>.</p> <p><b>3.1b</b> Data is recorded in a simple form such as a two-column table (possibly with some errors, for example, incorrect / missing headings or units) <b>(mark point)</b>.</p> <p><b>3.1c</b> A simple bar chart or line graph has been constructed from scales provided <b>(mark point)</b>.</p> <p>Overall, recording of results has no coherent structure.</p>	<p><b>3.2a</b> Rational, accurate observations have been made from first-hand evidence obtained during the investigation <b>(mark point)</b>.</p> <p><b>3.2b</b> Data is recorded in a more complex form such as a table of three or more columns with few errors that adequately represents the data obtained. There may be some inconsistency in recording of data in terms of number of significant figures <b>(mark point)</b>.</p> <p><b>3.2c</b> An appropriate graph or chart is constructed from candidate's own scale chosen, but with some guidance on the type of chart or graph <b>(mark point)</b>.</p> <p><b>3.2d</b> Observations that it would be appropriate to repeat are recognised <b>(mark point)</b>.</p> <p>Results are recorded in a structured way, although there may be some errors.</p>	<p><b>3.3a</b> Rational, accurate, reliable observations have been made from the first-hand evidence gained during the investigation <b>(mark point)</b>.</p> <p><b>3.3b</b> Data is recorded in a sophisticated way, such as a table of three or more columns, with correct units and headings, that represents the data obtained. There is consistency in recording data in terms of using an appropriate number of significant figures throughout <b>(mark point)</b>.</p> <p><b>3.3c</b> An appropriate chart or graph has been constructed independently, with no guidance given on scales <b>(mark point)</b>.</p> <p><b>3.3d</b> Anomalous results are identified and an explanation given why it would be appropriate to repeat certain results <b>(mark point)</b>.</p> <p>Results are recorded logically and clearly, with only minor errors.</p>
		<p>All three mark points are achieved here as the observations/measurements made, data recorded and graphs drawn are all above this level <b>(3 marks)</b>.</p> <p>There is structure in the recording of results, which is above this level.</p>	<p>Accurate observations and measurements have been obtained so the first mark point is achieved <b>(1 mark)</b>.</p> <p>The second mark point has been achieved. The tables of results (pages 4, 7, 9, 11, 12 and 15) have 3 or more columns and there are some inconsistencies in number of significant figures in the tables on pages 4, 12 and 15 <b>(1 mark)</b>.</p> <p>Charts have been drawn and annotated above this level <b>(1 mark)</b>.</p> <p>All results that are appropriate to repeat have been repeated and there is a comment about repeats on the suspended solids test e.g. 'we only did one repeat because it took so long to filter the juices' <b>(1 mark)</b>.</p> <p>Results are recorded in a structured way.</p>	<p>Accurate and reliable observations and measurements have been made <b>(1 mark)</b>. The second mark point is not achieved. The tables of results (pages 4, 7, 9, 11, 12 and 15) all have 3 or more columns, with correct headings and units, but the data recorded has inconsistent numbers of significant figures in places.</p> <p>There are three charts on pages 5, 13 and 16, drawn independently and with no guidance given on scales (see annotation) <b>(1 mark)</b>.</p> <p>There is no mention of any anomalous results so the fourth mark point is not achieved.</p> <p>Results are logical and clear, with no obvious errors.</p>
<p><b>Total marks for this candidate for strand 3: 9 marks</b>  <b>Maximum marks for Strand 3: 11 marks</b></p>				

### Additional Applied Science – Controlled Assessment Exemplar commentary

Strand	0 marks	Level 1	Level 2	Level 3
<b>4. Processing primary and secondary data / evidence</b>	No attempt made to identify patterns in the evidence or manipulate data	<p><b>4.1a</b> Simple patterns have been identified within data / evidence, with guidance <b>(mark point)</b>.</p> <p><b>4.1b</b> Simple calculations (such as calculation of a mean from three results) have been carried out. Calculations are poorly organised, lack coherent structure and may contain errors <b>(mark point)</b>.</p>	<p><b>4.2a</b> Patterns within data / evidence have been identified and the quantitative relationship between two variables described where appropriate <b>(mark point)</b>.</p> <p><b>4.2b</b> Calculations (such as a mean from a set of at least three results) have been carried out to an appropriate number of significant figures <b>(mark point)</b>.</p> <p><b>4.2c</b> The need to exclude any anomalous readings from the calculation has been recognised <b>(mark point)</b>.</p>	<p><b>4.3a</b> Patterns within data / evidence have been identified and clearly explained using, for example, linear, directly proportional or by describing a complex relationship where appropriate <b>(mark point)</b>.</p> <p><b>4.3b</b> Complex calculations involving mathematical formulae are carried out <b>(mark point)</b></p> <p><b>4.3c</b> to an appropriate number of significant figures and with few errors <b>(mark point)</b>.</p>
		Both mark points are achieved as the description of patterns and calculations made are both above this level <b>(2 marks)</b> .	<p>Patterns in the results of each test have been identified <b>(1 mark)</b>.</p> <p>Calculations of mean have been made for 3 of the tests (pp 12 and 15) to an appropriate number of significant figures <b>(1 mark)</b>.</p> <p>No reference has been made to anomalous results so this mark point is not achieved.</p>	<p>The patterns identified have not been explained so the first mark point is not achieved.</p> <p>Calculations of vitamin C content appear to have been made using a given formula but the working out has not been shown and there is no evidence that the candidate has done the calculation so this mark is not achieved, nor the third mark point.</p>
<p><b>Total marks for this candidate for strand 4: 4 marks</b></p> <p><b>Maximum marks for Strand 4: 8 marks</b></p>				

### Additional Applied Science – Controlled Assessment Exemplar commentary

Strand	0 marks	Level 1	Level 2	Level 3
<b>5. Analysing primary and secondary data / evidence</b>	No attempt to draw any conclusions from the data / evidence obtained	<p><b>5.1a</b> Conclusions containing a vague statement of what the evidence shows are given <b>(mark point)</b>.</p> <p><b>5.1b</b> The conclusions show little logical structure or organisation. There is no reference to secondary data <b>(mark point)</b>.</p>	<p><b>5.2a</b> Conclusions, showing some organisation and structure, are given and relate directly to the evidence obtained <b>(mark point)</b>.</p> <p><b>5.2b</b> Some comparison with secondary data has been made, as well as some suggestions made on how to increase the validity of the data <b>(mark point)</b>.</p>	<p><b>5.3a</b> Conclusions are clear and logical and relate directly to the evidence obtained (both primary and secondary), recognising its limitations <b>(mark point)</b>.</p> <p><b>5.3b</b> The conclusions illustrate a comprehensive scientific understanding <b>(mark point)</b>.</p>
		Both mark points are achieved as the standard of the conclusions is above this level <b>(2 marks)</b> .	The conclusions have structure and relate to the results <b>(1 mark)</b> . There is no comparison to secondary data so this mark point is not achieved.	Conclusions are clear and logical and relate to the results (pages 17 and 18). However, there is no comparison to secondary data so this mark point is not achieved. The conclusions show a comprehensive scientific understanding <b>(1 mark)</b> .
<p><b>Total marks for this candidate for strand 5: 4 marks</b> <b>Maximum marks for Strand 5: 6 marks</b></p>				

### Additional Applied Science – Controlled Assessment Exemplar commentary

Strand	0 marks	Level 1	Level 2	Level 3
<b>6. Evaluating the practical activity</b>	No evaluation evident	<p><b>6.1a</b> A basic evaluation of the practical activity (<b>mark point</b>)</p> <p><b>6.1b</b> and a simple suggestion for improvement (<b>mark point</b>) are given.</p> <p>Although there may be some valid points, there are significant errors and / or omissions in the use of technical terms, spelling, punctuation and grammar, leading to an overall lack of clarity.</p>	<p><b>6.2a</b> An evaluation of the practical activity is given, describing the effectiveness of working methods (<b>mark point</b>)</p> <p><b>6.2b</b> and making some justified suggestions for improvement so that more reliable evidence can be obtained (<b>mark point</b>).</p> <p>The evaluation contains a range of technical terms, although not all are used correctly and there are omissions and errors in spelling punctuation and grammar, leading to inconsistency and some lack of clarity.</p>	<p><b>6.3a</b> A reasoned and logical evaluation of the investigation is given, covering both strengths and weaknesses of working methods (<b>mark point</b>)</p> <p><b>6.3b</b> and including justified suggestions for improvement so that more reliable and precise evidence can be obtained (<b>mark point</b>).</p> <p>The evaluation is clearly expressed, using technical terms correctly, and with few errors in spelling, punctuation or grammar.</p>
		<p>Both mark points are achieved as the standard of the evaluation, including the suggestion for improvement, is above this level (<b>2 marks</b>).</p> <p>Use of terms, spelling, punctuation and grammar are all above this level.</p>	<p>There is an evaluation of the investigation which describes the effectiveness of the methods (<b>1 mark</b>).</p> <p>The improvements mentioned are ones which were made during the actual methods, but credit given for these (<b>1 mark</b>).</p> <p>There are some technical terms mentioned and some minor errors in spelling, punctuation and grammar.</p>	<p>The evaluation is quite brief and does not cover in any detail the strengths and weaknesses of the methods so the first mark point is not achieved.</p> <p>The improvements given do not explain how they might lead to the collection of more reliable and precise evidence so the second mark point is not achieved.</p> <p>The evaluation is quite clearly expressed but is brief, has limited use of technical terms and some errors.</p>
<p><b>Total marks for this candidate for strand 6: 4 marks</b></p> <p><b>Maximum marks for Strand 6: 6 marks</b></p>				

### Additional Applied Science – Controlled Assessment Exemplar commentary

Strand	0 marks	Level 1	Level 2	Level 3
<b>7. Workplace context</b>	No attempt to put the investigation into a workplace context	<b>7.1</b> A simple workplace application of the investigation is given. There is not necessarily any scientific evidence <b>(mark point)</b> .	<b>7.2a</b> A workplace application of the practical investigation is described and a suggestion made as to how the findings could be used <b>(mark point)</b> .  <b>7.2b</b> The opinion uses scientific fact but appreciates that this may be influenced by more evidence <b>(mark point)</b> .	<b>7.3a</b> A workplace application of the practical investigation has been researched and explained that summarises how the findings could be used <b>(mark point)</b> .  <b>7.3b</b> Scientific evidence from the investigation has been used to provide a basis for opinion <b>(mark point)</b> .
		This mark point is achieved as the workplace application given is above this level <b>(1 mark)</b> .	A workplace application has been described in the introduction (pages 1 and 2) and a suggestion made as to how the findings could be used <b>(1 mark)</b> .  The opinion on which fruit juice to give to toddlers is based on some scientific fact but there is no mention of any more evidence required so mark point not achieved.	The investigation is not linked to the role of a food analyst and how the results of the investigation would be communicated to the nursery so this mark point is not achieved.  Not all of the scientific evidence from the investigation has been used to provide the basis for the opinion on the best fruit juice for toddlers so this mark point is not achieved.
<b>Total marks for this candidate for strand 7: 2 marks</b>				
<b>Maximum marks for Strand 7: 5 marks</b>				
<b>Total marks for this candidate for assignment 2: 33 marks</b>				
<b>Total maximum marks: 50</b>				

# Additional Applied Science – Controlled Assessment Exemplar commentary

Candidate Name:

Candidate Number:

Assessment criteria achieved in each strand (tick as appropriate)

## Strand 1: Planning

1.1a	1.2a	1.3a
✓	✓	✓
1.1b	1.2b	1.3b
✓	✓	✓

Marks for Strand 1 6/ 6

2.1a	2.2a	2.3a
✓	✓	
2.1b	2.2b	2.3b
✓		
	2.2c	2.3c
	✓	

Marks for Strand 2 4 / 8

## Strand 3: Collecting data

3.1a	3.2a	3.3a
✓	✓	✓
3.1b	3.2b	3.3b
✓	✓	
3.1c	3.2c	3.3c
✓	✓	✓
	3.2d	3.3d
	✓	

Marks for Strand 3 9/ 11

## Strand 4: Processing data

4.1a	4.2a	4.3a
✓	✓	
4.1b	4.2b	4.3b
✓	✓	
	4.2c	4.3c

Marks for Strand 4 4/ 8

## Strand 5: Analysing data

5.1a	5.2a	5.3a
✓	✓	
5.1b	5.2b	5.3b
✓		✓

Marks for Strand 5 4/ 6

6.1a	6.2a	6.3a
✓	✓	
6.1b	6.2b	6.3b
✓	✓	

Marks for Strand 6 4/ 6

## Strand 7: Workplace context

7.1a	7.2a	7.3a
✓	✓	
	7.2b	7.3b

Marks for Strand 7 2/ 5

**Total marks for Assignment 2**

**33/50**