



National
Qualifications

Chemistry

Assignment

General assessment information

This pack contains general assessment information for centres preparing candidates for the assignment Component of Higher Chemistry Course assessment.

It must be read in conjunction with the specific assessment task for this Component of Course assessment, which may only be downloaded from SQA's designated secure website by authorised personnel.

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Contents

Introduction	1
What this assessment covers	2
Assessment	3
General Marking Instructions	8

Introduction

This is the general assessment information for the Higher Chemistry assignment.

This assignment is worth 20 marks out of the total of 120 marks available for this Course. The Course will be graded A-D.

Marks for all Course Components are added up to give a total Course assessment mark which is then used as the basis for grading decisions.

This is one of two Components of Course assessment. The other Component is a question paper.

This document describes the general requirements for the assessment of the assignment Component for this Course. It gives general information and instructions for assessors.

It must be read in conjunction with the assessment task for this Component of Course assessment.

Equality and inclusion

This Course assessment has been designed to ensure that there are no unnecessary barriers to assessment. Assessments have been designed to promote equal opportunities while maintaining the integrity of the qualification.

For guidance on assessment arrangements for disabled candidates and/or those with additional support needs, please follow the link to the Assessment Arrangements web page: www.sqa.org.uk/sqa/14977.html

Guidance on inclusive approaches to delivery and assessment in this Course is provided in the *Course Support Notes*.

What this assessment covers

The assessment will assess the skills, knowledge and understanding specified for the assignment in the *Course Assessment Specification*. These are:

- ◆ applying knowledge of chemistry to new situations
- ◆ selecting information from a variety of sources
- ◆ processing the information/data collected (using calculations and units, where appropriate)
- ◆ presenting information appropriately
- ◆ analysing the data/information collected/processed
- ◆ drawing valid conclusions and giving explanations supported by evidence/justification
- ◆ evaluating experimental procedures/practical investigations
- ◆ communicating findings/information effectively

Assessment

Purpose

The purpose of this assessment is to generate evidence for the added value of this Course by means of an assignment.

Assessment overview

Assessment should take place when the candidates are ready to be assessed.

This assignment requires candidates to apply skills, knowledge and understanding to investigate a relevant topic in Chemistry. The topic should draw on one or more of the key areas of the Course. The assessor must review the topic chosen to ensure that it is appropriate.

The assignment offers challenge by requiring skills, knowledge and understanding to be applied in a context that is one or more of the following:

- ◆ unfamiliar
- ◆ familiar but investigated in greater depth
- ◆ integrating a number of familiar contexts

The assessor has responsibility for ensuring that the topic chosen to be investigated by the candidate is sufficiently demanding. Some examples of suitable investigations are provided in the Higher Chemistry *Course and Unit Support Notes*. None of these examples are mandatory: they are intended simply to illustrate the level of demand that is expected of an assignment at Higher. Candidates should choose, with guidance, relevant topical contexts appropriate to the learning and teaching, but it is the assessor's responsibility to ensure that the topic will allow the candidate to provide evidence of an appropriate standard to achieve the full range of marks available.

This assignment has two stages:

- ◆ a **research** stage
- ◆ a **communication** stage

The **research** stage involves gathering data/information from experiment(s)/practical investigation(s), the internet, books, newspapers, journals, or any other appropriate source. Candidates must select, use and record their referenced sources. An appropriate experiment/practical investigation **must** be used as one of the data sources, but candidates may choose to include data from more than one experiment if it is appropriate for the aim. The experimental work from the *Researching Chemistry* Unit should normally be used as one (or more) of the experimental/practical investigation data sources. Any practical work undertaken will not be assessed as part of the assignment but may be assessed in the *Researching Chemistry* Unit.

Candidates may work individually or in small groups as part of the **research** stage when gathering information/data and especially when undertaking experiments/practical investigations, but assessors must ensure that candidates are able individually to meet the evidence requirements of this assessment.

In the course of their assignment, candidates are required to:

- ◆ choose a relevant topic in chemistry (the assessor must review the appropriateness of the topic chosen)
- ◆ state appropriate aim(s)
- ◆ explain the underlying chemistry of the topic researched
- ◆ research the topic by selecting relevant data/information
- ◆ carry out risk assessment of procedure
- ◆ process and present relevant data/information
- ◆ analyse data/information
- ◆ state conclusions
- ◆ evaluate their investigation
- ◆ present the findings of the research in a report

The evidence for this assignment will consist of the report. Of the total of 20 marks available for the assignment, the marking instructions provide 16 marks for skills and 4 marks for knowledge and understanding. The table below shows how these marks are allocated to each of the criteria against which the evidence will be assessed.

Criteria	Mark allocation
Aim(s)	1
Applying knowledge and understanding of chemistry	4
Selecting information	2
Risk assessment	1
Processing and presenting data/information	4
Analysing data/information	2
Conclusion(s)	1
Evaluation	3
Presentation	2

Assessment conditions

Assessors must exercise their professional responsibility in ensuring that evidence submitted by a candidate is the candidate's own work.

Candidates should start the assignment at an appropriate point in the Course. This will normally be when they have started work on the Units in the Course and have sufficient knowledge and skills to undertake the assignment. It is recommended that candidates use their work from the *Researching Chemistry* Unit, which is a 20 hour Unit, as the basis for the assignment. This assessment is not a timed assessment and in addition to the work undertaken in the

Researching Chemistry Unit, candidates should be given sufficient time to complete the Assignment report.

This assignment has two stages:

- ◆ a **research** stage
- ◆ a **communication** stage, during which the report is written

Candidates may access any appropriate resources during the **research** stage of this assignment.

During the **communication** stage of this assignment, candidates should have access to the following resources:

- ◆ Material collected by the candidate during the **research** stage. This may include, for example, the experimental data collected as part of the *Researching Chemistry* Unit, statistical, graphical, numerical or other experimental data; data/information from the internet; published articles or extracts; notes taken from a visit or talk; notes taken from a written or audio-visual source.

The assessor should check that the material used by the candidate in this communication stage conforms to the criteria above. It must not include a prepared draft report or elements of one.

Candidates may produce their report over a period of time. If the report is done over a number of sessions, then the assessor must retain the candidate's work between sessions. Following completion of the report there should be **no** re-drafting.

As a guide, evidence which meets the requirements of this Component of Course assessment is likely to be 800-1500 words, excluding tables, charts, diagrams and references.

The requirements of the assignment should be made clear to candidates at the outset.

Reasonable assistance may be provided prior to the formal assessment process taking place. Reasonable assistance may be given on a generic basis to a class or group of candidates. The term 'reasonable assistance' is used to try to balance the need for support with the need to avoid giving too much assistance. If any candidates require more than what is deemed to be 'reasonable assistance', they may not be ready for assessment or it may be that they have been entered for the wrong level of qualification.

In the **research** stage, reasonable assistance may include:

- ◆ directing candidates to the Instructions for Candidates
- ◆ clarifying instructions/requirements of the task
- ◆ advising candidates on the choice of the topic or issue

In the **communication** stage, reasonable assistance may include:

- ◆ directing candidates to the Instructions for Candidates
- ◆ clarifying instructions/requirements of the task

At any stage, reasonable assistance does **not** include:

- ◆ providing model answers
- ◆ providing feedback on drafts

The **research** stage will be conducted under some supervision and control. This means that although candidates may carry out some research outwith the learning and teaching setting, assessors should put in place processes for monitoring progress and ensuring that the work is the candidate's own and that plagiarism has not taken place.

Assessors should put in place mechanisms to authenticate that the research is the candidate's own work. For example:

- ◆ regular checkpoint/progress meetings with candidates
- ◆ short spot-check personal interviews
- ◆ checklists which record activity/progress
- ◆ photographs, film or audio evidence
- ◆ checking candidate lab books/blogs

Candidates may work individually or in small groups as part of the **research** stage. However, there must be clear evidence for each candidate to show that the candidate has met the evidence requirements.

The **communication** stage will be conducted under a high degree of supervision. This means that:

- ◆ candidates must be in direct sight of the assessor (or other responsible person) during the period of the assessment
- ◆ candidates must not discuss their work with each other

Evidence to be gathered

The following candidate evidence is required for this assessment:

- ◆ a report

The report will be submitted to SQA, within a given timeframe, for marking. The same report cannot be submitted for more than one subject.

General Marking Instructions

General Marking Principles for Higher Chemistry assignment

This information is provided to help you understand the general principles you must apply when marking candidate responses to this assignment. These principles must be read in conjunction with the detailed Marking Instructions, which identify the key features required in candidate responses.

- (a) Marks for each candidate response must always be assigned in line with these general marking principles and the detailed Marking Instructions for this assessment.
- (b) Marking should always be positive. This means that, for each candidate response, marks are accumulated for the demonstration of relevant skills, knowledge and understanding: they are not deducted from a maximum on the basis of errors or omissions.

Detailed Marking Instructions for Higher Chemistry assignment

Read the whole report before assigning any marks. Credit should be given for appropriate information wherever it is given in the report.

Criteria	Expected response	Max mark	Additional guidance	Notes
Aim(s)	States appropriate aim(s)	1	The aim(s) must be clearly stated and appropriate to the investigation undertaken.	<p>The aim must describe clearly what is to be investigated, eg 'to investigate which vegetables contain the most Vitamin C'.</p> <p>Acceptable versions of an aim could be: 'the effect of temperature on antioxidants', NOT: 'to investigate antioxidants'.</p> <p>The aim must be stated separately from the title.</p> <p>The word 'aim' does not need to be stated.</p>
Apply knowledge and understanding of chemistry	Explains the topic, using the underlying chemistry	4	<p>4 marks should be awarded to a candidate who has:</p> <ul style="list-style-type: none"> ♦ provided correct explanations of the topic researched using chemistry terms/ideas which are at a depth appropriate to Higher Chemistry (this does not mean the answer has to be 'excellent' or 'complete') <p>The response might include: a statement</p>	<p>Ideally the underlying chemistry would be within one section within the report; however Markers should be aware that candidates may include the underlying chemistry throughout the report.</p> <p>Credit should only be given for underlying chemistry not general information eg historical/socio-economic/medical information.</p> <p>It is sufficient for the underlying chemistry</p>

Criteria	Expected response	Max mark	Additional guidance	Notes
			<p>of the principles involved, formulae, chemical equations, calculations, chemical properties related to the bonding present.</p> <p>3 marks should be awarded to a candidate who has:</p> <ul style="list-style-type: none"> ♦ provided mostly correct explanations of the topic researched using chemistry terms/ideas which are at a depth appropriate to Higher Chemistry <p>2 marks should be awarded to a candidate who has:</p> <ul style="list-style-type: none"> ♦ provided some correct explanations of the topic researched using chemistry terms/ideas which are at a depth appropriate to Higher Chemistry <p>1 mark should be awarded to a candidate who has:</p> <ul style="list-style-type: none"> ♦ provided only one correct explanation of the topic researched, using chemistry terms/ideas which are at a depth appropriate to Higher Chemistry <p>0 marks: The candidate fails to meet the</p>	<p>to be relevant to the topic without being specific to the aim.</p> <p>If any of the candidate's explanation of the underlying chemistry has been given credit in any other section then that piece of information should not be considered when awarding marks for the underlying chemistry.</p> <p>If the underlying chemistry has been copied verbatim from a reference or website then the candidate is not demonstrating understanding and should be awarded 0 marks.</p> <p>Information which is quoted from references in this section and then explained or expanded upon by the candidate is acceptable.</p>

Criteria	Expected response	Max mark	Additional guidance	Notes
			minimum standards required for 1 mark.	
Select information	Selects sufficient relevant data/information for inclusion in the report	2	<p>2 marks: The data/information selected by the candidate for presentation/processing/analysis is both relevant and sufficient.</p> <p>1 mark: The data/information selected by</p>	<p>This means that the raw data/information MUST be included in the report. This could take the form of photocopies of pages from journals, books, print-outs of appropriate sections of webpages, tables of data from experiments conducted by the candidate, etc.</p> <p>It must be clear what is raw data and what is processed data. If it is unclear treat first set of information/data for each source as raw data.</p> <p>Web links, book and journal references are not sufficient on their own.</p> <p>For 2 marks there must be relevant data from a minimum of two sources, which relate to the aim. For the data/information to be sufficient there should be enough data/information which could allow the candidate to draw a conclusion that relates to the aim.</p> <p>For Chemistry, one of these sources must be</p>

Criteria	Expected response	Max mark	Additional guidance	Notes																												
			<p>the candidate for presentation/ processing/analysis is relevant but insufficient.</p> <p>0 marks: The data/information selected by the candidate for presentation/ processing/analysis is neither relevant nor sufficient.</p> <p>This could include raw data from experiments/practical activities, extracted tables, graphs, diagrams and text. It might include, for example, statistical, graphical, numerical or experimental data; data/information from the internet; published articles or extracts; notes taken from a visit or talk; notes taken from a written or audio-visual source.</p>	<p>data from practical work in which the candidate has taken an active part.</p> <p>For 1 mark there must be relevant data from one source, which relates to the aim.</p> <table border="1"> <thead> <tr> <th>Source</th> <th>Relevant</th> <th>Sufficient</th> <th>Mark</th> </tr> </thead> <tbody> <tr> <td>2</td> <td>✓</td> <td>✓</td> <td>2</td> </tr> <tr> <td>2</td> <td>✓</td> <td>×</td> <td>1</td> </tr> <tr> <td>2</td> <td>×</td> <td>×</td> <td>0</td> </tr> <tr> <td>1</td> <td>✓</td> <td>✓</td> <td>1</td> </tr> <tr> <td>1</td> <td>✓</td> <td>×</td> <td>1</td> </tr> <tr> <td>1</td> <td>×</td> <td>×</td> <td>0</td> </tr> </tbody> </table> <p>one relevant source gains 1 mark two relevant sources both of which are sufficient gains 2 marks</p>	Source	Relevant	Sufficient	Mark	2	✓	✓	2	2	✓	×	1	2	×	×	0	1	✓	✓	1	1	✓	×	1	1	×	×	0
Source	Relevant	Sufficient	Mark																													
2	✓	✓	2																													
2	✓	×	1																													
2	×	×	0																													
1	✓	✓	1																													
1	✓	×	1																													
1	×	×	0																													
Risk assessment	Safety measures taken	1	<p>1 mark: The candidate states the majority of appropriate safety measures taken during their experimental work.</p> <p>0 marks: The candidate fails to meet the minimum standards required for 1 mark.</p>	<p>It is taken for granted that candidates will follow general safety rules, such as wearing safety glasses/goggles.</p> <p>Appropriate safety measures include knowledge of hazards associated with chemicals and hazards associated with experimental procedures. Candidates would</p>																												

Criteria	Expected response	Max mark	Additional guidance	Notes
				<p>be expected to detail precautions that should be taken to minimise risk, eg carrying out a procedure such as spraying a chromatogram in a fume cupboard or removing a delivery tube from a liquid before stopping heating a test tube or flask.</p> <p>Where an experiment does not require particular or specific safety measures the candidate must make a statement indicating this.</p>
Process and present data/information	Data/information is processed and presented	4	<p>Processing can include, for example: performing calculations, summarising referenced text – although the marks are awarded for processing, it must be clear where the raw or extracted data/information came from.</p> <p>Presenting processed data/information can include, for example, appropriate formats from: summary, graph, table or chart (one must be graph, table or chart). In each case, sufficient detail should be included to convey the data/information. In all cases the candidate must clearly reference the source of the original data.</p>	<p>The raw data/information must be included in the report in order for marks to be awarded for processing and presenting.</p> <p>Only one set of data needs to be processed. NB From 2017 onwards, candidates must process and present their experimental data. Where only one set of data is being processed, this must be their experimental data.</p> <p>To access these marks there must be evidence of both processing and presenting. If either processing or presenting is not included then no marks can be awarded for this section.</p>

Criteria	Expected response	Max mark	Additional guidance	Notes
			<p>NB For 2017 onwards, candidates must process and present their experimental data.</p> <p>4 marks should be awarded to a candidate who has processed and presented all data/information correctly and appropriately.</p>	<p>There is no requirement for candidates to present data/information in different formats. However, one of the chosen formats must be a graph, table or chart, otherwise no marks can be awarded in this section.</p> <p>For plotting of graphs and charts on graph paper allow $\pm\frac{1}{2}$ box tolerance.</p> <p>For calculations: a suitable presentation format would be a clearly set-out worked example.</p> <p>When using graphing packages, all major and minor gridlines should be included. Points should be visible but not excessively large. Best fit lines should be used where appropriate.</p> <p>To attain 4 marks, processing and presenting must be correct, eg all appropriate labels, units, headings must be included, almost all (90%) calculations (with units)/points plotted (within tolerance)/table contents/summaries (with units must be correct and there must be cross referencing directly associated with each piece of</p>

Criteria	Expected response	Max mark	Additional guidance	Notes
			<p>3 marks should be awarded to a candidate who has processed all data/information correctly and appropriately and presented most data/information correctly and appropriately.</p> <p>or</p> <p>who has processed most data/information correctly and appropriately and presented all data/information correctly and appropriately.</p> <p>2 marks should be awarded to a candidate who has processed and</p>	<p>raw/presented data/information.</p> <p>1 mark: all presentation formats are correct.</p> <p>1 mark: all headings/labels/units are correct.</p> <p>1 mark: almost all (90%) of processing is correct, ie plotting/calculations/table contents/summaries (with units) etc.</p> <p>1 mark: cross referencing directly associated with each piece of raw/ presented data/information</p> <p>If there are no references at the end of the report, for each piece of data, then to award the 'cross-referencing' mark a full reference (eg URL) must be given <i>with</i> the data.</p> <p>If a full reference (eg Title and Aim for an experiment or full URL for data from an internet source) is not given with the data source then the full reference must be provided in the reference section for the cross-referencing mark to be awarded.</p>

Criteria	Expected response	Max mark	Additional guidance	Notes
			<p>presented some of the data/information correctly and appropriately.</p> <p>1 mark should be awarded to a candidate who has processed and presented little data/information correctly and appropriately.</p> <p>0 marks: The candidate fails to meet the minimum standards required for 1 mark.</p>	
Analyse data/information	Data/information is analysed	2	<p>Analysis will include interpreting data/information included in the report (which may/may not have been processed by the candidate) to identify relationships. This may include further calculations.</p> <p>2 marks for correctly analysing the data/information.</p> <p>1 mark for some correct analysis of the data/information.</p>	<p>Candidates may use either raw data/information (eg graphs or tables from the internet, journals) that they have included, or their processed data/information or a combination of both.</p> <p>Analysis may include comparisons, patterns and trends, discussion of results, what graphs show, etc.</p> <p>2 marks for correctly analysing data/information from at least two sets of data/information.</p> <p>1 mark for either correctly analysing one set of data – the candidate might calculate a value for an unknown from an experiment but might fail to compare the value obtained with</p>

Criteria	Expected response	Max mark	Additional guidance	Notes
			<p>0 marks: The candidate fails to meet the minimum standards required for 1 mark.</p>	<p>published data or correctly analysing part of the data from at least two sets of data/information – the candidate might present related data from two sources and correctly analyse data from one source but fail to make any comparison between the two sets of data.</p>
Conclusion(s)	States valid conclusion(s)	1	<p>1 mark for stating a conclusion that relate(s) to the aim(s) and is supported by evidence from the candidate’s research.</p> <p>0 marks: The candidate fails to meet the minimum standards required for 1 mark.</p>	<p>If no aim has been stated then the mark cannot be awarded. Although the conclusion may relate to the aim, it must be supported by information in their report, otherwise the conclusion mark cannot be awarded.</p> <p>If the candidate states multiple aims, then the conclusion must relate to all aims given (unless the candidate stated that the aim was modified to narrow the focus).</p> <p>If it is appropriate for the data, this mark can be awarded if the candidate EXPLAINS WHY the data does not allow a conclusion to be drawn.</p>

Criteria	Expected response	Max mark	Additional guidance	Notes
Evaluation	Evaluation of the investigation	3	<p>For marks to be awarded for evaluation, candidates must make judgements based on criteria. The criteria, upon which judgements of the investigation are made, may include the following (not an exhaustive list):</p> <ul style="list-style-type: none"> ◆ robustness of findings ◆ validity of sources ◆ reliability of data/information ◆ evaluation of (experimental) procedure <p>1 mark for each valid, evaluative comment based on relevant criteria, to a maximum of 3 marks.</p> <p>0 marks: The candidate has not met the standards described for 1 mark.</p>	<p>Each comment must be supported by appropriate justification, for example:</p> <p>Robustness – findings are supported by other reputable sources.</p> <p>Validity of sources – explanation of why a source might be considered to be biased/unbiased, key variables controlled.</p> <p>Reliability of data/information – from a scientific journal, sample size, repeated results.</p> <p>Evaluation of procedures – candidates should indicate steps that might be taken to improve the accuracy/reliability/reproducibility of any results presented in their report.</p> <p>Suitability, control of variables, limitations of equipment, sources of uncertainty, suggestions for improvements.</p> <p>Evaluation of procedures is only valid if the experimental method is described in the report.</p>

Criteria	Expected response	Max mark	Additional guidance	Notes
Presentation	Appropriate presentation References	2	<p>Maximum of 2 marks for the presentation of the report.</p> <p>1 mark for each of:</p> <ul style="list-style-type: none"> ◆ appropriate title and structure ◆ the references to at least two sources used in the report are given in sufficient detail to allow them to be retrieved by a third party – if one of the sources is an experiment/practical activity, then the title and the aim should be recorded 	<p>The third person, passive voice is the preferred style for report writing, but this is not a requirement.</p> <p>Although references may appear within the body of the report they must also appear at the end of the report.</p> <p>The structure of the report does not need to follow the structure listed in the Marking Instructions or Candidates' Guide.</p> <p>If one of the sources is an experiment/practical activity, then only the title of the experiment/practical and aim are required as raw data has been dealt with elsewhere.</p> <p>References of websites must be complete URL addresses – www.bbc.co.uk is not acceptable.</p> <p>References of text books must include title, author, page number and either ISBN number or version/edition number.</p> <p>References of journals must include journal title, author, volume and page number.</p> <p>At least two references must be given correctly to access this mark.</p>
		20		

Administrative information

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History of changes

Version	Description of change	Authorised by	Date
1.1	‘What this assessment covers’ section and ‘Assessment overview’ section – list of skills, knowledge and understanding assessed in the assignment amended for clarification. Detailed Marking Instructions amended to include a column of additional notes.	Qualifications Manager	September 2014
1.2	Detailed Marking Instructions updated to further clarify Marking Instructions.	Qualifications Manager	September 2015
1.3	Detailed Marking Instructions updated to further clarify Marking Instructions.	Qualifications Manager	September 2016

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