Higher Chemistry
Assignment
Assessment task

This document provides information for teachers and lecturers about the coursework component of this course in terms of the skills, knowledge and understanding that are assessed. It must be read in conjunction with the course specification.

Valid from session 2019-20 and until further notice.
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Introduction

This document contains instructions for teachers and lecturers, marking instructions, and instructions for candidates for the Higher Chemistry assignment. You must read it in conjunction with the course specification.

This assignment is worth 20 marks (scaled to 30). This is 20% of the overall marks for the course assessment.

This is one of three course assessment components. The other components are question papers.
Instructions for teachers and lecturers

General information

This information applies to the assignment for Higher Chemistry.

The assignment assesses the application of skills of scientific inquiry and related chemistry knowledge and understanding.

The assignment allows candidates to demonstrate the following skills, knowledge and understanding:

- applying knowledge of chemistry to new situations, interpreting information and solving problems
- planning, designing and safely carrying out experiments/practical investigations to test given hypotheses or to illustrate particular effects
- selecting information from a variety of sources
- presenting information appropriately in a variety of forms
- processing the information (using calculations and units, where appropriate)
- making predictions and generalisations based on evidence/information
- drawing valid conclusions and giving explanations supported by evidence/justification
- evaluating experiments/practical investigations and suggesting improvements
- communicating findings/information effectively

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

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

Candidates research and report on a topic that allows them to apply skills and knowledge in chemistry at a level appropriate to Higher.

The topic must be chosen with guidance from teachers and/or lecturers and must involve experimental work.

The assignment has two stages:

- research
- report

The research stage must involve experimental work which allows measurements to be made. Candidates must also gather data/information from the internet, books or journals.

Candidates must produce a report on their research.
Conditions of assessment
Setting, conducting and marking the assignment

Setting
The assignment is:

- set by centres within SQA guidelines
- set at a time appropriate to the candidate’s needs
- set within teaching and learning and includes experimental work at a level appropriate to Higher

Conducting
The assignment is:

- an individually produced piece of work from each candidate
- started at an appropriate point in the course
- conducted under controlled conditions

Marking
The report is submitted to SQA for external marking.

All marking is quality assured by SQA.

Assessment conditions
Controlled assessment is designed to:

- ensure that all candidates spend approximately the same amount of time on their assignments
- prevent third parties from providing inappropriate levels of guidance and input
- mitigate concerns about plagiarism and improve the reliability and validity of SQA awards
- allow centres a reasonable degree of freedom and control
- allow candidates to produce an original piece of work
There are two levels of control.

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<thead>
<tr>
<th>Under a high degree of supervision and control</th>
<th>Under some supervision and control</th>
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<tbody>
<tr>
<td>♦ the use of resources is tightly prescribed</td>
<td>♦ candidates do not need to be directly supervised at all times</td>
</tr>
<tr>
<td>♦ all candidates are within direct sight of the supervisor throughout the session(s)</td>
<td>♦ the use of resources, including the internet, is not tightly prescribed</td>
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<tr>
<td>♦ display materials which might provide assistance are removed or covered</td>
<td>♦ the work an individual candidate submits for assessment is their own</td>
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<tr>
<td>♦ there is no access to e-mail, the internet or mobile phones</td>
<td>♦ teachers and/or lecturers can provide reasonable assistance</td>
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<td>♦ candidates complete their work independently</td>
<td>♦ interaction with other candidates does not occur</td>
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<tr>
<td>♦ no assistance of any description is provided</td>
<td>♦ no assistance of any description is provided</td>
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The assignment has two stages.

<table>
<thead>
<tr>
<th>Stage</th>
<th>Level of control</th>
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<tbody>
<tr>
<td>♦ research</td>
<td>conducted under some supervision and control</td>
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<tr>
<td>♦ report</td>
<td>conducted under a high degree of supervision and control</td>
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</table>
Instructions
Teachers and/or lecturers must exercise their professional responsibility to ensure that the report submitted is the candidate's own work.

It is recommended that no more than 8 hours is spent on the whole assignment.

A maximum of 2 hours is allowed for the report stage.

Teachers and/or lecturers must ensure candidates understand the requirements of the task. The instructions for candidates outline the requirements for the assignment and teachers and/or lecturers must give these to candidates at the outset. These must not be altered or supplemented by centre-devised material.

Teachers and/or lecturers must not, at any stage, provide candidates with a template or model answers.

Research stage
The research stage is conducted under some supervision and control. See ‘Conditions of assessment’ section.

Choosing the topic
The teacher and/or lecturer must ensure that a range of topics is available for candidates to choose from.

At the start of the research stage, the teacher and/or lecturer must agree the choice of topic with the candidate to ensure that it:

♦ is appropriate for Higher Chemistry
♦ has associated experimental work that can generate numerical data
♦ allows the candidate the opportunity to access all of the available marks

Teachers and/or lecturers must minimise the number of candidates investigating the same topic within a class.

A range of topics chosen for investigation will create the climate in which candidates can produce original work within the conditions of assessment.

Once candidates have agreed the topic with their teacher and/or lecturer, they must formulate an aim.

Formulating the aim
To ensure the candidate’s aim is achievable the teacher and/or lecturer must provide advice on its suitability, taking into account:

♦ health and safety considerations
Teachers and/or lecturers must not provide candidates with an aim. After the candidate has formulated an aim, they can progress through the research stage.

The candidate’s research consists of gathering data relevant to the aim from an experiment and comparative data/information from an internet/literature source. The candidate’s research may also involve gathering extracts from internet/literature source(s) to support their description of the underlying chemistry.

Candidates can carry out their research in any order. They do not have to follow the order outlined below.

**Experimental research**

Teachers and/or lecturers can supply instructions for the experimental procedure. This must only be a basic list of instructions. These instructions must not include details of the number and range of values or reference to repeats; candidates must decide on these for themselves. Where there is a safety issue, a maximum value for the range may be provided.

Teachers and/or lecturers are responsible for ensuring that appropriate risk assessment has been carried out and that candidates have guidance on the safe and correct use of chemicals and equipment.

Teachers and/or lecturers must not provide candidates with experimental data.

Teachers and/or lecturers must not provide candidates with a blank or pre-populated table for experimental results.

Candidates must carry out the experimental work individually or as part of a small group. (A small group is defined as having two, three or four candidates.)

Group work may be an appropriate approach in a number of circumstances, for example:

- to encourage diversity of research topic
- where experiments are labour- or time-intensive
- where resources are limited

Where candidates work in a group, teachers and/or lecturers must ensure every candidate participates in the experimental work. Within the small group, it is acceptable for candidates to share experimental data. However, they must not share experimental data between groups.

Teachers and/or lecturers must not provide feedback to candidates on their results. However, where candidates identify a problem with their results and indicate that they wish to repeat the experiment, they may do so.
**Internet/literature research**

The internet/literature research must be the work of the individual candidate; candidates cannot work in a group to carry out this research.

Candidates may carry out research to find comparative data/information and underlying chemistry outwith the direct supervision of teachers and/or lecturers.

Candidates can have access to websites, journals and/or books to find information on the underlying chemistry. They can extract information from these to take into the report stage. The internet/literature research must be the work of the individual candidate.

Candidates must undertake research using only websites, journals and/or books, to find secondary data/information.

Candidates must find internet/literature data that they can compare to their experimental data and record the reference to the source.

This can be data that:

- matches the sample range used
- is not an exact match for the sample range used
- is generic and illustrates a trend or pattern expected in the experimental data

Teachers and lecturers must not provide candidates with a set of experimental data to compare with the candidates' own data.

Teachers and/or lecturers must not provide feedback to candidates on their research.

In circumstances where there is difficulty in locating secondary data/information, teachers and/or lecturers may provide candidates with a wide list of URLs and/or a wide range of books and/or journals. (A wide list is specified as a minimum of six.) This list must have a sufficient range of sources to allow candidates to make decisions about which data/information is relevant.

Only where internet access is an issue, teachers and/or lecturers can provide candidates with a printed copy of the full content of all URLs given in the list.

Teachers and lecturers must ensure that the level of demand of the research task is the same for all candidates irrespective of the approach taken.

**Report stage**

The report stage is conducted under a high degree of supervision and control. See ‘Conditions of assessment’ section.

Candidates must be given a maximum of 2 hours to produce the report.

- This can be a continuous period of time or split over a number of successive subject lessons.
Centres are responsible for ensuring that candidates are given no more than the maximum time.

If candidates produce the report over a number of lessons, then the teacher and/or lecturer must retain and store candidates’ work securely between lessons.

Candidates may word-process their report and use appropriate software to produce graphs – providing that the assessment conditions are met.

Teachers and/or lecturers must check that all materials (in any format) that each and every candidate will use in the report stage fit the following criteria.

The only materials that can be used in the report stage are:

- the instructions for candidates, which must not have been altered
- the candidate’s raw experimental data which may be tabulated, however must not have additional blank or pre-populated columns for mean and derived values
- data/information taken from the internet or literature, which must not include sample calculations
- a record of the source(s) of internet or literature data/information
- the experimental method, if appropriate
- extract(s) from internet/literature source(s) to support the underlying chemistry

An extract must be:

- chosen by the candidate – they must select what information to extract
- verbatim – it must be a direct copy, which can be a printout, photocopy or handwritten (and word for word)
- from an internet/literature source – not from centre-devised course material or class notes. Candidate notes of any description are not permitted.
- checked by the teacher or lecturer to ensure that it is an extract (unannotated), and not notes or a draft

There is no size limit on an extract; however, it must be an extract and not the full document.

Candidates must not have access to a previously prepared draft of a report or any part of a report.

In addition, candidates must not have access to the assignment marking instructions during the report stage.

Candidates must not have access to the internet during the report stage.

Teachers and/or lecturers must not provide any form of feedback to a candidate on their report.

Teachers and lecturers must not read the reports or provide any form of feedback to candidates during the report stage.
Following completion of the report stage candidates must not be given an opportunity to redraft their report.

Evidence to be gathered

The following candidate evidence is required for this assessment:

- a report

The report is submitted to SQA, within a given time frame, for marking.

The same report cannot be submitted for more than one subject.
Marking instructions

In line with SQA’s normal practice, the following marking instructions for the Higher Chemistry assignment are addressed to the marker. They will also be helpful for those preparing candidates for course assessment.

Candidates’ evidence is submitted to SQA for external marking.

General marking principles

Always apply these general principles. Use them in conjunction with the detailed marking instructions, which identify the key features required in candidates’ responses.

a Always use positive marking. This means candidates accumulate marks for the demonstration of relevant skills, knowledge and understanding; marks are not deducted for errors or omissions.
**Detailed marking instructions**

Read the whole report before assigning any marks.

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<tr>
<th>Section</th>
<th>Max mark</th>
<th>Expected response and marking instructions</th>
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<tbody>
<tr>
<td>1</td>
<td>Aim (1 mark)</td>
<td>An aim that describes clearly the purpose of the investigation. The word ‘aim’ is not required, but the statement of the aim should be separate from the title. Acceptable versions of an aim could be: ♦ ‘To determine the effect of cooking time on the concentration of vitamin C.’ ♦ ‘To measure the sulfur dioxide content of white wines.’ Note: ‘to investigate antioxidants’ or ‘to investigate alcohols’ would not be acceptable.</td>
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<tr>
<td>Section</td>
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<td>Expected response and marking instructions</td>
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<tr>
<td>2</td>
<td>Underlying chemistry (3 marks)</td>
<td>3 An account of chemistry relevant to the aim of the investigation. Mark this section holistically. Award marks for the ‘quality’ of the underlying chemistry at a depth appropriate to at least Higher level. Underlying chemistry may be found anywhere in the assignment report but award the marks in this section. The candidate must demonstrate an understanding of relevant chemistry and use their own words wherever possible. They can, however, include complex diagrams and complicated structural formulae from an internet and/or literature source.  ♦ Award 3 marks for a good understanding of relevant chemistry. The account does not need to be what might be termed ‘excellent’ or ‘complete’.  ♦ Award 2 marks for a reasonable understanding of relevant chemistry.  ♦ Award 1 mark for a limited understanding of relevant chemistry.  ♦ Award 0 marks for demonstrating no understanding of relevant chemistry. Only award marks for underlying chemistry. Do not award marks for general information, for example historical or socio-economic information.</td>
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### 3 Data collection and handling (6 marks)

<table>
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<tr>
<td>3 a</td>
<td>1</td>
<td>A brief summary of the approach used to collect experimental data.</td>
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Where the candidate has not demonstrated the ability to summarise the method, do not award the mark.

The summary need only be in sufficient detail that the nature of the experiment can be visualised. The candidate does not need to include details such as the concentrations and volumes of solutions used.

It is taken for granted that the candidate will follow general safety rules, such as wearing safety glasses and/or goggles. The summary must identify any additional safety measures that should be taken to minimise risk, for example 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.

Where an experiment does not require any specific safety measures, the candidate must make a statement indicating this.

A diagram on its own is insufficient to gain this mark.

Acceptable summaries of an experimental approach could be:

- ‘Tea samples were titrated with iodine solution using starch as the indicator. We wore gloves when handling iodine solution.’
- ‘The alcohol concentration of different drinks was measured by distilling the drink and measuring the density of the distillate. A hot plate was used and there were no flames nearby.’
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| 3 b     | 1        | **Sufficient raw data from the candidate’s experiment.**  
Where appropriate, repeated measurements must be included.  
The number and range of values must be appropriate to the aim. A minimum of three values will be appropriate in some investigations; however, the number will depend upon the aim of the assignment.  
For example:  
♦ Where the aim is to investigate the effect of chain length on the heat energy released when alcohols are burned, a minimum of three alcohols are required to show a trend.  
♦ Where the aim is to investigate the hardness of water samples from different locations, it would be acceptable for the candidate to test water samples from three locations.  
In this section, do not penalise errors in the presentation of data, such as missing headings or missing units from tables.  
Award this mark for raw, unprocessed data and not mean or derived values calculated from raw data. |
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<th>Max mark</th>
<th>Expected response and marking instructions</th>
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| 3 c     | 1        | **Data presented in correctly produced table(s) and correct units shown for calculated values.**  
Experimental data must be tabulated.  
♦ Every column must have a clear heading.  
♦ Units must be indicated in column headings or given after every data entry.  
Appropriate units must be stated for values calculated by the candidate from experimental data.  
In this section, do not penalise errors in the calculation of values. |
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<th>Section</th>
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<th>Expected response and marking instructions</th>
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<tr>
<td>3d</td>
<td>1</td>
<td>Values calculated correctly using a chemical relationship. The candidate must correctly complete a chemical calculation based on experimental data. Chemical calculations include: ♦ calculations involving the relationship between moles, concentration and solution volumes ♦ calculations involving the relationship between moles and gram formula masses ♦ calculations of reacting masses or gas volumes based on balanced equations ♦ calculation of percentage yields ♦ enthalpy calculations ♦ calculations of relative or average rates for a chemical reaction Where measurements have been repeated, all mean and/or average values must be calculated correctly. In this section, do not award marks for the calculation of averages and/or titre values from burette readings on their own.</td>
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<td>3e</td>
<td>1</td>
<td>Data relevant to the experiment from an internet/literature source.</td>
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<td>Section</td>
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<td>Expected response and marking instructions</td>
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<tr>
<td>3f</td>
<td>1</td>
<td>A citation and reference for a source of the internet/literature data. The candidate must cite the literature source within the body of the report and give the reference later in the report.</td>
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<table>
<thead>
<tr>
<th>Source</th>
<th>Reference</th>
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<tr>
<td>Website</td>
<td>Full URL for the page(s) with date accessed</td>
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<tr>
<td></td>
<td>The URL ‘www.bbc.co.uk (Dec 2017)’ is not acceptable, but</td>
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<td><a href="http://www.bbc.co.uk/education/topics/z2snb9g">http://www.bbc.co.uk/education/topics/z2snb9g</a> (Dec 2017) is an acceptable reference.</td>
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<td>Journal</td>
<td>Title, author, journal title, volume and page number</td>
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<tr>
<td>Book</td>
<td>Title, author, page number and either edition or ISBN</td>
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<tr>
<td>Data booklets</td>
<td>Title, page number and either year of publication or ISBN or full URL</td>
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<td>Analysis (1 mark)</td>
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<td>6</td>
<td>Conclusion (1 mark)</td>
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| 7       | Evaluation (3 marks) | 3 Evaluation of the investigation  
Award 1 mark for each valid evaluative statement relating to the candidate’s data, supported by appropriate justification, identifying the impact of the evaluative statement, to a maximum of 3 marks.  
The evaluative statements could relate to experimental procedures, results or data from internet/literature sources.  
A maximum of one of these marks is available for an evaluation of data from internet/literature sources. |
| 8       | Structure (1 mark) | 1 A clear and concise report with an informative title.  
The structure of the report does not need to follow the structure suggested in the marking instructions or instructions for candidates, but should flow in a logical manner.  
Note: ‘Higher Chemistry assignment’ alone is not acceptable. |
| Total   | 20       |                                             |
Instructions for candidates

This assessment applies to the assignment for Higher Chemistry.

This assignment is worth 20 marks. This is 20% of the overall marks for the course assessment.

It assesses the following skills, knowledge and understanding:

- applying knowledge of chemistry to new situations, interpreting information and solving problems
- planning, designing and safely carrying out experiments/practical investigations to test given hypotheses or to illustrate particular effects
- selecting information from a variety of sources
- presenting information appropriately in a variety of forms
- processing the information (using calculations and units, where appropriate)
- making predictions and generalisations based on evidence/information
- drawing valid conclusions and giving explanations supported by evidence/justification
- evaluating experiments/practical investigations and suggesting improvements
- communicating findings/information effectively

Your assignment has two stages:

- research
- report

Your teacher or lecturer will let you know if there are any specific conditions for doing this assessment and tell you how the assignment will be carried out.

In this assignment, you have to investigate a topic in chemistry by doing research.

Your research involves gathering data/information from an experiment and from internet/literature sources.

You then produce a report on your investigation.

Your teacher or lecturer will not mark your report at any point. It is sent to SQA for marking.
Research stage

Choosing your topic

- You need to choose a relevant topic in chemistry to investigate.
- You must agree your topic with your teacher or lecturer.

Deciding your aim

- Once you have chosen your topic you need to decide on the aim of your investigation. Remember that you need to do an experiment and find data/information to compare with your experimental results.
- Your teacher or lecturer will provide advice on the suitability of your aim, in terms of safety and availability of resources. They will not assess your aim.

Experimental research

- When choosing your experiment, remember it must allow measurements to be taken.
- When carrying out your experiment, you must work either on your own or as part of a small group. If you are working as part of a small group, you must take an active part.
- Make sure you use a sufficient number of values over a wide enough range to meet the aim of your investigation.
- You must repeat your experiment, if possible.
- Your raw experimental data may be tabulated, however tables must not have additional blank or pre-populated columns for mean and derived values.
- You will use your raw experimental data during the report stage.

Internet/literature research

- You need to find data/information from the internet, books and/or journals that you can compare to your experimental data. This could be a table or a graph, or information from diagrams or text. This data/information does not need to exactly match your experiment but could illustrate the trend or pattern expected in your experimental data.
- It is important that you record where you get your data/information from in enough detail that another person could find it. This is known as a reference.
- In your report you will need to describe the chemistry relevant to your aim. You can gather extracts from the internet, books and/or journals to help you write your description of the underlying chemistry. Extracts must be from an internet/literature source — not from centre-devised course material or class notes. An extract must be a direct copy, which can be a printout, photocopy or handwritten (word for word). There is no size limit on an extract; however, it must be an extract and not the full document. During the report stage you will need to show your understanding by writing this description using your own words.
Report stage

Producing the report

- The report must be all your own work.
- When producing your report, you will be supervised at all times.
- You have 2 hours to complete your report.

Resources

During the report stage you are only allowed to have certain materials.

<table>
<thead>
<tr>
<th>You can have:</th>
<th>You cannot have a previously prepared:</th>
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<tbody>
<tr>
<td>◆ these instructions for candidates</td>
<td>◆ draft of your report</td>
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<tr>
<td>◆ extracts you have gathered from the internet, books and/or journals to help you describe the chemistry</td>
<td>◆ draft of any part of your report</td>
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<tr>
<td>relevant to your aim. Extracts must not contain sample calculations.</td>
<td>◆ sample calculations from any source</td>
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<td>◆ the experimental method</td>
<td>◆ a table containing additional blank or pre-populated columns for mean and derived values</td>
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<tr>
<td>◆ your raw experimental data, which may be tabulated. However, the table must not have additional blank or</td>
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<td>pre-populated columns for mean and derived values</td>
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<tr>
<td>◆ your internet or literature data/information, which must not contain sample calculations, including the</td>
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<tr>
<td>reference to the source of the data/information</td>
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</table>

Your teacher or lecturer cannot provide you with feedback or tell you how to improve your report.
Guidance on producing your report

Your report must be easy to follow.

You may find that using headings will help to make your report clear.

Title
♦ Your title must tell the reader what your report is about.

Aim
♦ Your aim must describe clearly the purpose of your investigation.

Underlying chemistry
♦ You must describe the chemistry relevant to your aim.
♦ You must use your own words as much as possible.
♦ You may choose to include:
  — formulae or balanced equations
  — an explanation of properties
  — explanations of relationships or trends
  — an explanation of the meaning of any chemical terms used
  — copies of diagrams which you would find difficult to draw, for example, complicated structural formulae
♦ You can quote from sources as long as you give a description or explanation showing that you understand the chemistry.
♦ Do not include a passage copied directly from your extracts. This would not show that you understand the chemistry.

Description of experiment
♦ You must give only a brief description that shows you can summarise your experimental method. You must not give a full description.
♦ When you carried out your experiment, you followed general safety rules, for example wearing safety glasses or goggles. Your description of the experiment must identify any additional safety measures you took to minimise risk. If your experiment did not require any additional safety measures, you must state this.
Experimental data

♦ You must include a table showing all of the raw data measurements (start and end values) you recorded during your experiment.
♦ Make sure you include column headings and units (where appropriate).
♦ Using your experimental data, you must carry out a chemical calculation.
♦ Chemical calculations include:
  — calculations involving the relationship between moles, concentration and solution volumes
  — calculations involving the relationship between moles and gram formula masses
  — calculations of reacting masses or gas volumes based on balanced equations
  — calculation of percentage yields
  — enthalpy calculations
  — calculations of relative or average rates for a chemical reaction
♦ You should show at least one sample calculation.
♦ Make sure you include units in your calculated values.
♦ If you have carried out repeat experiments, you must calculate average values.

Graphical presentation

♦ You must produce a graph of your experimental results.
♦ The graph must:
  — be a scatter graph, line graph or a bar graph, whichever is appropriate for your data
  — be large enough to allow points to be read accurately
  — have suitable scales, labels and units on the axes
♦ You must use graph paper or graphing software.
♦ If you are using graphing software, you must include both major and minor gridlines. You must use plotting symbols that are clear but not too large.
♦ If you are plotting a scatter graph, a line or curve of best fit should usually be drawn. However, if there is no obvious pattern to your plotted data points, you should not try to draw a line or curve of best fit.
Data from an internet/literature source

♦ You must include data from an internet/literature source that you can compare with the data from your experiment.
♦ You must cite your internet/literature source within the body of the report near to the relevant data/information.
♦ You can cite a source in many ways. One example is to put a number, for example (1), next to the data/information and the same number beside the reference given later in the report. A citation cannot be a URL.
♦ You must include a reference later in the report.
♦ You must include the following information in a reference:

<table>
<thead>
<tr>
<th>Source</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Website</td>
<td>full URL for the page or pages, with the date accessed</td>
</tr>
<tr>
<td>Journal</td>
<td>title, author, journal title, volume and page number</td>
</tr>
<tr>
<td>Book</td>
<td>title, author, page number and either edition or ISBN</td>
</tr>
<tr>
<td>Data booklet</td>
<td>title, page number and either year of publication or ISBN or full URL</td>
</tr>
</tbody>
</table>

Analysis

You must compare your experimental data with the data from your internet/literature source.

Conclusion

You must state a conclusion that relates to your aim and is supported by all the data included in your report. This must not be a restatement of results.

Evaluation

You must make three statements relating to your data, supported by appropriate justifications, which evaluate the data you have included, identifying the impact of your evaluative statement.

These statements can relate to:

♦ your experimental procedure
♦ your results
♦ data from your internet/literature source(s)

No more than one of these statements can evaluate data from your internet/literature source(s).
**Summary**

You can use this table to check you have covered all the sections in your report.

<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title and structure</td>
<td>An informative title and a structure that can be easily followed.</td>
<td>1</td>
</tr>
<tr>
<td>Aim</td>
<td>A description of the purpose of your investigation.</td>
<td>1</td>
</tr>
<tr>
<td>Underlying chemistry</td>
<td>A description of the chemistry relevant to your aim, which shows your understanding.</td>
<td>3</td>
</tr>
<tr>
<td>Data collection and handling</td>
<td>A brief description of your experiment, including safety measures.</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Sufficient data from your experiment.</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Data from your experiment presented in a table(s) with headings and units.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Units shown after any values you have calculated.</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Values correctly calculated from your experimental data using a chemical relationship.</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Data/information from an internet/literature source.</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>A citation for an internet/literature source and the reference later in the report.</td>
<td>1</td>
</tr>
<tr>
<td>Graphical presentation</td>
<td>Appropriate type of graph used to present your experimental data.</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Suitable scales.</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Suitable labels and units on axes.</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>All data plotted accurately, with line or curve of best fit if appropriate.</td>
<td>1</td>
</tr>
<tr>
<td>Analysis</td>
<td>Experimental data compared to data from internet/literature source.</td>
<td>1</td>
</tr>
<tr>
<td>Conclusion</td>
<td>A conclusion relating to your aim, based on all the data in your report.</td>
<td>1</td>
</tr>
<tr>
<td>Evaluation</td>
<td>Three evaluative statements supported by justifications and identifying impact.</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>20</td>
</tr>
</tbody>
</table>

Once complete, give your report to your teacher or lecturer to submit to SQA.
History of changes

<table>
<thead>
<tr>
<th>Version</th>
<th>Description of change</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.0</td>
<td>‘Instructions for teachers and lecturers’ section:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>◆ ‘Instructions’ sub-section:</td>
<td>September 2019</td>
</tr>
<tr>
<td></td>
<td>— clarification that instructions for candidates must not be altered or supplemented by centre-devised materials</td>
<td></td>
</tr>
<tr>
<td></td>
<td>◆ ‘Choosing the topic’ sub-section:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>— information added that there must be a range of topics available for candidates to choose from and that teachers/lecturers must minimise the numbers investigating the same topic within a class</td>
<td></td>
</tr>
<tr>
<td></td>
<td>◆ ‘Experimental research’ sub-section:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>— candidates can be given only a basic list of instructions for the experimental procedure and must decide on range, interval and number of repeats for themselves</td>
<td></td>
</tr>
<tr>
<td></td>
<td>◆ ‘Internet/literature research’ sub-section:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>— this must be the work of the individual candidate</td>
<td></td>
</tr>
<tr>
<td></td>
<td>— candidates must undertake research using only websites, journals and/or books</td>
<td></td>
</tr>
<tr>
<td></td>
<td>— provision of a wide list of URLs or a wide list of journals and/or books should be the exception</td>
<td></td>
</tr>
<tr>
<td></td>
<td>— provision of the full content of a wide list of sources should be the exception</td>
<td></td>
</tr>
<tr>
<td></td>
<td>◆ ‘Report stage’ sub-section:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>— teachers/lecturers must check the materials of each and every candidate</td>
<td></td>
</tr>
<tr>
<td></td>
<td>— information added to the bullet points about raw experimental data, internet/literature data and extracts</td>
<td></td>
</tr>
<tr>
<td></td>
<td>— information added on extracts</td>
<td></td>
</tr>
<tr>
<td></td>
<td>— list of items that candidates cannot have access to in the report stage replaced with ‘Candidates must not have access to a previously prepared draft of a report or any part of a report.’</td>
<td></td>
</tr>
<tr>
<td></td>
<td>◆ Marking instruction for ‘evaluation’ updated for clarification.</td>
<td></td>
</tr>
</tbody>
</table>
‘Instructions for candidates’ section updated to reflect the changes made in the ‘instructions for teachers and lecturers’ section.

Note: you are advised to check SQA’s website to ensure you are using the most up-to-date version of this document.

**Security and confidentiality**

This document can be used by SQA approved centres for the assessment of National Courses and not for any other purpose.

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