

# NQ Verification 2016–17

## Key Messages Round 2

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### Section 1: Verification group information

Verification group name:	Chemistry
Verification event/visiting information	Visiting
Date published:	June 2017

#### National Courses/Units verified:

H4KK 76	Higher	Researching Chemistry
H7XR 77	Advanced Higher	Researching Chemistry

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### Section 2: Comments on assessment

#### Assessment approaches

All centres verified had used the unit assessment support packs (UASPs) produced by SQA.

#### H4KK 76 Researching Chemistry (Higher)

There are two outcomes for this unit at Higher: outcome 1 (assessment standard 1.1) which involves candidates gathering and recording information from two sources related to their research topic and outcome 2 (assessment standards 2.1 and 2.2) which involves planning and carrying out practical research.

The chosen research topic should draw on one or more key area(s) of the Higher Chemistry course. Similar research topics were being used in most of the centres verified this year, these included: antioxidants in foods, enthalpy of combustion of alcohols and the sulfur dioxide content of wine. Some centres had made use of a briefing document with candidates which contained focus questions.

Assessment standard 1.1 requires candidates to give a clear description of the chemistry appropriate to their research topic. Most centres verified this year had made use of a 'day book' approach where candidates had recorded key terms including appropriate chemical equations and structures. References were either contained within the description of the chemistry or in a separate reference section.

Assessment standard 2.1 requires candidates to plan their practical investigation. Most candidates verified had included clear instructions in their plan and when candidates were working in a group details of the roles of each group member were provided. An assessor checklist should be used to show that candidates have made an appropriate contribution to planning.

Assessment standard 2.2 requires candidates to follow procedures safely and record observations/measurements. Most candidates verified had included observations and/or raw data in their day book/class jotter.

Candidates were found to have maintained a record of work either through a log or by recording dates throughout their daybook/class jotter. Both methods are acceptable as long as regular dates are recorded with some brief comments.

In some cases, candidates had produced a typed report which covered all three assessment standards in the Researching Chemistry unit.

### **H7XR 77 Researching Chemistry (Advanced Higher)**

There are two outcomes for this unit. Visiting verification focused on outcome 1 which has three assessment standards (1.1, 1.2 and 1.3).

At Advanced Higher there is a wide variety of research topics although some are common to most centres such as aspirin synthesis, vitamin C in juices, bleach analysis, wine analysis, iron content of iron tablets, antacids and calcium carbonate content of shells.

Assessment standard 1.1 requires candidates to gather information from at least three sources to demonstrate a clear understanding of the chemistry related to the topic. In doing so candidates should use key terms and ideas at a depth appropriate to Advanced Higher Chemistry. Some research topics may initially seem more suited to Higher Chemistry (such as vitamin C in juices) but a clear explanation of the multiple processing of data can ensure the topic is at Advanced Higher level.

Assessment standard 1.2 requires candidates to plan their practical research including a clear description of how the practical work should be carried out. The plan must also include a risk assessment. It is acceptable for centres to issue candidates with a template for a standard risk assessment. Centres should note that candidates should not be provided with a pro forma or template for other aspects of outcome 1.

Assessment standard 1.3 requires candidates to follow procedures safely and record observations/measurements. An observational checklist can be used to record assessor comments relating to the practical stage. Many assessors make annotations on candidate evidence to record that procedures were followed safely and this is equally acceptable.

Candidates were found to have maintained a record of work either through a log or by recording dates throughout their daybook/class jotter. Both methods are acceptable as long as regular dates are recorded with some brief comments.

## **Assessment judgements**

On the vast majority of candidate evidence there were clear annotations by assessors and also internal verifiers showing where individual assessment standards had been achieved. The majority of assessment judgements at both levels were accurate and reliable. Most centres had made use of candidate record sheets to record assessment judgements. Most centres also provided observation checklists to record assessment judgements related to candidates working in a group (at Higher) and following safety procedures (at both levels).

### **H4KK 76 Researching Chemistry (Higher)**

In order to achieve assessment standard 1.1, candidates are required to show a clear understanding of the chemistry related to a specific topic. This will often involve chemical equations and clear explanations of terms which are appropriate to Higher Chemistry. For example, if candidates are researching the vitamin C content of foods/drinks then terms such as 'antioxidant' and 'free radical' are relevant. Some centres had assessed candidates to have achieved assessment standard 1.1 even though there was a lack of sufficient chemistry. It should be noted that the evidence must demonstrate that the candidate has a clear understanding of the chemistry related to the topic and therefore passages of information copied directly from sources do not demonstrate a clear understanding. Centres could review the candidate evidence which can be downloaded from the Understanding Standards section of the SQA Secure website for clarity on the appropriate depth of chemistry required to achieve assessment standard 1.1. Almost all candidates provided at least two retrievable sources of information.

Assessment standard 2.1 was generally assessed well by centres. Most candidates provided a clear plan for their practical research which contained sufficient detail. Some candidates who were working as part of a group did not clearly state the individual roles and responsibilities of all group members.

Assessment standard 2.2 was also assessed well by centres. Most candidates recorded raw data/observations in an appropriate format with appropriate units. Centres should note that repeat measurements involve more than repeat titres when undertaking titration experiments. For example, in determining the vitamin C content in fruit juice it is expected that candidates will carry out titrations until concordant results are achieved on the sample. A second sample would then be used to obtain repeat concordant results.

Almost all candidates maintained a regular record of work either as a log or date entries made throughout their evidence. Both methods are acceptable.

### **H7XR 77 Researching Chemistry (Advanced Higher)**

The majority of centres assessed assessment standard 1.1 well. At Advanced Higher candidates can research a topic which contains chemistry suited to the Higher course. With such a topic, candidates can provide explanations of techniques such as back titration to ensure sufficient chemistry at Advanced Higher level. A few centres accepted insufficient chemistry. Centres could review

the candidate evidence which can be downloaded from the Understanding Standards section of the SQA Secure website for clarity on the appropriate depth of chemistry required to achieve assessment standard 1.1. Almost all candidates provided at least three retrievable sources of information.

Assessment standard 1.2 was assessed well by centres. Occasionally candidates had failed to include all concentrations and/or a risk assessment for each chemical used in their practical research.

Assessment standard 1.3 was also assessed well by centres. Centres frequently provided an observation checklist to record that procedures had been followed safely, or a clear statement on the candidate evidence to the same effect. On the vast majority of evidence, results were recorded in an appropriate format including units.

Almost all candidates maintained a regular record of work either as a log or date entries made throughout their evidence. Both methods are acceptable.

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### **Section 3: General comments**

Evidence provided for both Researching Chemistry units was either in the form of a candidate 'day book' or a typed report, both are acceptable. Many Advanced Higher candidates provided a typed report which could then form part of a project report.

In general, there is a clearer understanding of what is required in the researching chemistry units at both levels. Centres regularly annotate candidate evidence to show where assessment standards have been met. Most centres internally verified candidate evidence although there is no requirement to internally verify all candidates at a particular level. When undertaking internal verification activities centres may wish to verify a sample of candidates at a particular level, if assessment judgements are found to be reliable there would not be a further requirement to sample all candidates at that particular level. Where an internal verifier has disagreed with an initial assessment judgement it is helpful to show the final assessment judgement to aid external verification.

A small number of centres had included, and assessed, processed results and evaluation points as part of the unit assessment. It should be noted that in order to achieve the assessment standards in the Researching Chemistry units for both levels there is no requirement to process information, conclude or evaluate. Where the work from the Researching units is being used for the Higher assignment or the Advanced Higher project, processing and evaluating should not be assessed as part of the units. At Higher this could be construed as providing feedback on draft work and at Advanced Higher it could constitute providing model answers.