



**National Qualifications 2012
Internal Assessment Report**

Chemistry (Revised Higher)

The purpose of this report is to provide feedback to centres on verification in National Qualifications in this subject.

National Qualifications (NQ) Units

Titles/levels of NQ Units verified:

Revised Higher/Researching Chemistry/ FE4J 12 (visiting verification)

All verification of this Unit took place between February and March 2012.

General comments

Verification involved centres who were early adopters of the new Revised Higher course so national standards were being explored during the verification process. It was obvious, in all centres, that a lot of time and effort had been spent to ensure that the centre and the candidates were well prepared for this internally assessed Unit and, as expected, the centres themselves have already been reflecting on areas for future development.

All centres used one of the two SSERC investigation briefs from the Education Scotland website (Alcohols or Antioxidants). Each brief contains five investigations and each investigation contains a number of focus questions. Outcomes 1 (the focus question) and 3 (the scientific communication) are individual tasks, Outcome 2 (the investigation) is carried out in groups.

Outcome 1: Some focus questions require a full answer; some could be answered with one word. To overtake O1PC(a), all centres insisted on meaningful answers taking up a minimum of one paragraph (approximately ten lines) and candidates were encouraged to redraft when a response was judged to be too short or the standard of English was poor. Most centres asked for Outcome 1 evidence to be submitted online to make it easier to check website references. Most centres checked every reference and all centres checked a minimum of 50%. Assessment of work done online requires a checklist which can be initialled and, preferably, dated when the work of individual candidates has been assessed. The record sheet shown on page 87 of the Arrangements document can be downloaded and adapted to include a column for the date and further columns to record evidence of internal verification.

Outcome 2: The majority of centres used in-house and quite detailed checklists to record the assessment of Outcome 2: in all cases the date of the final assessment was recorded. Each SSERC brief contains an experimental procedure so O2PC(a) 'planning' means distributing tasks amongst the group, collecting apparatus, suggesting modifications to procedures and deciding how and when to take and record results. Candidates in several centres had problems with missing results when they started to work on Outcome 3. Most data was recorded on pieces of paper which group members mislaid. This generated discussion in all but one of the centres verified; that single centre used small jotters as 'daybooks'. The group recorded all their results in a daybook which was kept in school and was always available whenever Outcome 3 was being worked on.

Outcome 3: all centres encouraged candidates to use correct English and all insisted on redrafting if the English was poor. All centres were familiar with the National Unit Specification from the Arrangements document and most had seen the draft NAB, Researching Chemistry FE4J 12/NAB001. The majority of Outcome 3 evidence was in the form of a lab report and, although there is no need to include a procedure as SSERC have provided one, several centres preferred to use the traditional format and included a procedure directly after the aim.

Unit specifications, instruments of assessment and exemplification materials

Assessors in all centres were familiar with the Unit specification, found on pages 76-88 of the Arrangements document (December 2010) on the SQA website (*chemistry/revise/higher/arrangements, dec 2010*) and with the instrument of assessment consisting of three Outcomes and eight Performance Criteria exemplified in the Unit specification. Most centres had also seen the draft National Assessment Bank pack, Revised Chemistry (Higher), Researching Chemistry FE4J 12/NAB001. The final version of this NAB has been available on the SQA secure site since March 2012. Assessors were all familiar with the additional exemplification materials found on the Education Scotland website (*educationscotland/search for chemistry/page 2/Higher Chemistry: Learning and Teaching-All resources/scroll down to Researching Chemistry*).

Several centres had created more user-friendly material by summarising documents from the Education Scotland site, eg preparing a Scientific Communication, and focusing on the sections needed by candidates as they tackled Outcome 3.

Evidence Requirements

There is a clear understanding of the requirements for Outcomes 1 and 2, but the evidence requirements for Outcome 3 are less clear.

Administration of assessments

All assessment instruments for FE4J 12 are provided by SQA, along with advice on how to administer them. All centres verified used their professional judgement in interpreting this advice.

Evidence of a continual discussion between class teachers/lecturers about the standards required, and of extensive internal verification (IV), was seen in the majority of centres: in a small number of centres the procedures in place for IV were exemplary, eg:

1. The record sheet from the NAB document was used as a checklist and each Performance Criterion was ticked off and dated as it was overtaken: dates of internal verification were recorded and initialled by the Internal Verifier.
2. The subject lead teacher (SLT) in the centre understood the need for internal verification and the school has a policy of SLT internally verifying 20% of all candidate evidence for internally assessed courses across all

subjects. All evidence of internal assessment had been signed and dated.

Areas of good practice

1. In all centres verified there was extensive evidence of regular discussions between the candidates and the class teacher during the planning stage of each investigation.
2. It was apparent that all candidates understood the Outcomes and Performance Criteria and they had been well prepared (using resources available on the Education Scotland website) before attempting the lab report.
3. Several centres used the assessment sheet from page 6 of the NAB document to assess Outcome 1. This has the advantage of keeping the focus question in front of the candidate as they type their answer.
4. Many different approaches to the organisation of the Unit were seen. One centre started the Unit in June/August 2011. The Outcomes were discussed with pupils and all were given a timeline. During the times set aside for work on this Unit, two computer labs were booked so the whole group could work, at the appropriate times, on material needed to overcome Outcome 1 and Outcome 3. The experimental work (Outcome 2) was integrated into the main course and the final write-ups happened towards the end of the course in February/March. Another centre incorporated the Education Scotland resources into the early part of the course then dedicated two weeks of teaching time and completed the Unit just before Christmas. In the majority of centres, a computing suite was booked and the whole class answered their (prepared) focus question under supervision and submitted their answers online.
5. Candidates in several centres had problems with missing results when they started to work on Outcome 3. Most data was recorded on pieces of paper which group members mislaid. This generated discussion in all but one of the centres verified; that centre alone had used small jotters as a 'daybook'. The group recorded all their results in a daybook which was kept in school and was always available whenever Outcome 3 was being worked on. This system worked very well as the daybook could also be used as evidence that O2, PC(a) & PC(b) had been overtaken.
6. In one centre the class teacher had produced a template to allow students to fill in raw data and have it converted to an Excel graph. This was very useful to the candidates as drawing graphs on Excel is not an easy process. They produced a line-of-best-fit calibration curve and then used it to determine the sugar or alcohol content of the drinks tested.
7. One centre used a template for the Outcome 3 lab report which had a front cover with a box for the Aim (thus O3, PC(a) was overtaken) and a box for the draft number to be recorded, which made it easier for staff to keep track of the online redrafts.

Specific areas for improvement

1. O1 and 2, PC(a) & (b): Teacher's records of candidate attainment should be signed and dated only when the individual candidate has completed that Outcome.
2. O3PC (a): The aim should be at the start of the scientific communication rather than part way through it.
3. O3PC (b): Tables of results must contain correct units. Titration results should include initial and final burette readings so that the titre calculation can be checked.
4. O3PC (b): There is no need to describe the procedure in the report (or presentation) as SSERC have provided experimental procedures. Where results are presented in graphical form, the axes must be correctly labelled and although, at this level, tense does not matter, best practice is to encourage the use of the past passive.
5. O3PC(c): In several cases verifiers found it difficult to identify a conclusion. Best practice is to use clear headings or sections within the scientific communication.
6. O3PC(d): The NAB document states:

Your evaluation may include:

- ◆ an assessment of the effectiveness of your experimental procedure
- ◆ a discussion of the variables controlled
- ◆ possible improvements in the experimental procedures
- ◆ possible sources of error
- ◆ suggestions for further work
- ◆ predictions or generalisations based on your results
- ◆ an assessment/explanation of the relevance of your results

It is not necessary to include all these points in the evaluation, but it should be remembered that, as stated on page 82 of the Arrangements document, 'the external examination for this Course contains questions...' on this Unit so some, or all, of these areas could be useful teaching points for the final exam.