NQ Verification 2015–16
Key Messages Round 2

01 Section 1: Verification group information

Verification group name:	**Physics**
Verification event/visiting information	**Event and visiting**
Date published:	**June 2016**

National Courses/Units verified:

H25C 74	National 4	Added value unit
H4L1 76	Higher	Researching Physics
H7XG 77	Advanced Higher	Investigating Physics

02 Section 2: Comments on assessment

Assessment approaches

For National 4 the evidence produced by the candidates should relate clearly to a key area from any of the other three units within the Physics course. Where a report is chosen as the communication format, the structure of the report supplied in the advice provided within the unit assessment support pack would be the suggested format that centres should follow. To achieve this unit it is important that the activities used are at the appropriate level for the course.

It is important that, where a candidate achieves an individual assessment standard within the evidence provided, the centre clearly identifies this on the candidate's evidence to aid both internal and external verification.

Assessment standard 1.1 requires the candidates to demonstrate an understanding of the physics involved at the appropriate level. They are also required to state the effect the selected issue has on society or the environment. This makes it important that the topic picked is linked to a key area and set at the National 4 level.

Assessment standard 1.2 is part of the research stage and the candidates have to select relevant data/information from at least two relevant sources. These sources can be either totally from the internet, books, journals or other relevant publication or a combination of these, they could also choose to use a practical experiment as one of the sources with the other coming from the list above. It is important that for any source the candidate lists the source in enough detail that would allow another person to find the same evidence quickly. If a book is used the title, author, ISBN and page numbers would be required or if they used an experiment the title and aim must be recorded.

When a candidate is selected for verification it is important that the individual's log book is included as part of the evidence submitted to allow the selected data/evidence to be confirmed rather than requiring the candidate to include all raw data in a final 'write up'. This evidence allows assessment standard 1.3 to be checked where the candidate has to present the selected data from one source in an appropriate format that is different from that used for the raw data. This can only be assessed if the raw and process data are included to allow comparison to take place as to the accuracy of the processing to be checked.

Assessment standard 1.4 requires the candidate to use physics theory to explain what the chosen topic has had an impact on — the environment or society. The impact can be either positive or negative as decided by the candidate but must be backed up with relevant physics theory at the appropriate National 4 level.

Assessment standard 1.5 is the final communication phase for the added value unit where the candidate communicates the overall findings from the research phase. This communication stage must include a clear aim and an overall evaluation of the data included as this brings the research information and the manipulated information together. This information should be in an appropriate format that allows an overall assessment judgement to be made and agreed upon.

Most of the centres selected for round 2 used a standard scientific report with a small number using a conference style poster or printing out the PowerPoint slides from the presentation to convey the relevant information/findings. It is important that when a PowerPoint is used that the speaker notes are included and are clear enough to allow another person to follow them.

For the Researching Physics (Higher) unit, visiting verification was carried out.

For assessment standard 1.1, candidates are required to research a topic that has a link to any of the key areas within the other three units within the Higher Physics course. The candidate is required to record at least two sources for the data/information used in the topic to a standard that would allow the assessor and the verifier to find the information easily when they are checking its validity. If the candidates download or copy information from text it is important that this is converted into their own words as a way to demonstrate some understanding of what evidence the candidate feels is relevant to the research topic selected.

To achieve assessment standard 1.1 the candidate must include sufficient physics, at the appropriate level, to show a clear understanding of the topic. The guidance notes for the centres requires a 'statement' in the format of a few sentences but at Higher level this would usually be much more to allow a fuller explanation of the physics involved to be explained in enough detail to allow the candidate to show a clear understanding of the physics relevant to the topic selected. This could be from a number of paragraphs to a number of pages of notes.

Assessment standard 2.1 is where the candidates are required to design and carry out a practical investigation based on the topic of interest. At Higher level this can be carried out as a small group of candidates but the centre staff must check that everyone takes an active part in the design and collection of information from this stage of the Researching Physics unit, especially since candidates will be using this data in their assignment.

Assessment standard 2.2 is the completion of the practical work and again can be carried out as part of a small group with each candidate being actively involved in the collection of data and the correct recording, including headings and units, in an appropriate format.

The centres selected for visiting verification this year all used appropriate formats to allow the candidates to record their research and experimental findings.

Centres are reminded that the use of a template or pro forma is not permitted.

For the Investigating Physics (Advanced Higher) unit, visiting verification was carried out.

Centres are reminded that all work for the Investigating Physics unit is individual work and group work is not allowed. Candidates should be choosing, with guidance, the topic they are investigating and unless a centre has a large number of candidates, each candidate should be choosing a different topic. Where it is necessary for the same topic to be investigated by a small number of candidates owing to a large cohort, then the centre must ensure candidates do not collude in their work. This is particularly important since the work from the Investigating Physics unit will be used as the basis for the project.

Centres are also reminded that the use of a template or pro forma is not permitted.

For assessment standard 1.1, candidates must give a clear statement of the physics topic selected for the whole investigation. This could be in the form of a few sentences but must be followed by enough evidence to demonstrate that the candidate can demonstrate the use of physics terms and knowledge at an appropriate level suitable for Advanced Higher Physics. The knowledge to support the candidate in developing the investigation project should come from at least three sources and it is important that these are recorded in enough detail that would allow the assessor and verifier to retrieve the full evidence.

Assessment standard 1.2 is where the candidate must complete the practical investigation including a clear aim for the practical activity to be completed. This could be for one experimental procedure, where the procedure is lengthy and complex, or, more typically, for multiple procedures but it is important that this stage is a solo activity and no group work is allowed. The information supplied should be detailed enough, including measurements to be taken and any risks associated with the procedure, to allow another person to be able to carry out the practical/experimental stage.

Assessment standard 1.3 is the completion of the practical work and again must be carried out individually. The candidate must collect relevant data and record this in the most appropriate format; this should include repeated measurements, where appropriate, and calculated averages, along with all associated uncertainties.

All of the centres selected for visiting verification used an appropriate log book or 'daybook' to record the candidates' findings.

Assessment judgements

It is clear from the centres selected this year for National 4 added value unit that the staff and candidates have a clearer understanding of the national standard as the evidence supplied was well presented with clear centre decisions evident for the candidates' work.

For assessment standard 1.1, most candidates had included enough detail in the identification of the area of physics selected in the communication phase to allow this to be verified. A small number of centres still failed to include the candidate's log book to allow this to be confirmed.

Most candidates selected topics clearly linked to the National 4 course key areas but a number included photocopies of National 5 assignments as evidence of attainment.

For assessment standard 1.2, the evidence supplied demonstrated that candidates were supplying full details for each reference used. This allowed the verification process to be seamless where any information required to be checked. As with assessment standard 1.1 some centres require to send in the candidate log book to allow the verifier to confirm the centre decision in relation to the appropriateness and relevance of the data selected.

Assessment standard 1.3 requires some of the raw data from the research phase to be presented in a different format to that of the original source. This can only be verified if the raw data is available to compare the new format against. In physics it is usual that a graph will be used, where appropriate, and that the type of graph best fits the evidence supplied, ie a line graph rather than a bar graph where the variables in the raw data are continuous.

Where data is selected, the candidates should be encouraged to display this in an appropriate table with clear headings and units for all columns. The averages should be calculated to allow a graph to be drawn.

For all assessment standards the centre should clearly identify the location of the evidence used to make the centre's judgement as this would aid not only internal verification but also the external verification process. Where a disagreement is identified between the assessor and the verifier it is important that the final decision is clearly highlighted.

For visiting verification of Researching Physics (Higher) centres supplied mostly interim evidence.

Assessment standard 1.1 requires the candidates to make a clear statement at the beginning of the research stage as to the topic being selected. This must include enough physics knowledge at Higher level to show a clear understanding of the topic selected. With most centres the underlying physics was clearly available for this assessment standard, where it was supplied for verification, but the overall statement was not included.

The statement at Higher level must have enough physics to demonstrate a clear understanding of the topic being investigated so will be a few paragraphs to a few pages in length. It should not be just a few sentences.

Assessment standard 2.1 demonstrated that most centres used small groups to design the practical/experimental setup. The assessment was enhanced with clear evidence of individual involvement in this stage of the unit with some changes to the design made in line with centre apparatus availability.

Assessment standard 2.2 was not fully completed by most candidates, as the table of results should be in the most appropriate format and averages calculated. Most candidates produced clear tables for the results but missed out the headings and units for each column used.

For visiting verification of Investigating Physics (Advanced Higher) centres supplied mostly interim evidence.

For assessment standard 1.1, all the candidates selected made a clear statement as to the topic being investigated. Most candidates had selected a number of experiments to carry out in support of the topic selected but the level of theory investigated was below that required for the unit at Advanced Higher level.

With assessment standard 1.2, most candidates had selected the appropriate experimental procedure(s) to support the investigation but most were in the same format as that viewed from books or the internet. It is a requirement that this should be in a format that would allow anyone with similar knowledge to carry out the practical work with no additional support.

Assessment standard 1.3 was not fully completed by most of the candidates as they had the table for the results but not calculated averages or listed the sources

of uncertainty in the experimental procedure. The tables had clear headings and units supplied by all candidates.

03 Section 3: General comments

As it is appropriate to use an outcome 1 report from one of the other three units as a source of data for the National 4 added value unit this could reduce the assessment burden. If this is selected the candidate must supply the title and aim of the experiment as one of the sources, along with the raw data selected.

It is appropriate to ask the candidates to redraft responses given to help them cover the requirements of the unit in one go. If this is carried out then the centre must make sure they do not supply too much support to lead the candidates into only one possible answer but can give enough support to help focus the final submission.

For example, if the candidate had a table of results with missing units in the headings the centre staff could ask them to check the tables for their data. Giving the candidate advice on what unit they should include is inappropriate.

It is important that the level of support given to the candidates does not go above that demonstrated in the unit assessment support pack. Some centres have devised log books that cover the required level but a few supplied suggested answers to some of the areas required for achievement of the assessment standard, which was inappropriate.

For the Researching Physics unit (Higher, for session 2016–17 onwards centres will be able to use the evidence of candidates achieving the unit as evidence of outcome 1 in the other units, without the need to match evidence.

For the Investigating Physics unit (Advanced Higher) centres can use the evidence of candidates achieving the unit as evidence of outcome 1 for the other units, without the need to match evidence.

It is also important that centres have an effective internal verification process that allows the standards applied to be the same, not just within one teaching group but across teaching groups. Most centres have developed a clear internal verification process that is applied across the other three units but not always with the Researching Physics or the Investigating Physics units.

When evidence is sent into SQA for a centre selected for verification it is important that the centre includes verified evidence for some candidates to demonstrate the effective use of the centre policy. Centres are required to include a copy of the policy so it is important to allow this to be checked.