Course Report 2015

Subject	Physics
Level	National 5

The statistics used in this report have been compiled before the completion of any Post Results Services.

This report provides information on the performance of candidates which it is hoped will be useful to teachers, lecturers and assessors in their preparation of candidates for future examinations. It is intended to be constructive and informative and to promote better understanding. It would be helpful to read this report in conjunction with the published assessment and marking instructions for the examination.

Section 1: Comments on the Assessment

Component 1: Question paper

The National 5 question paper consists of Section 1 which is an objective test worth 20 marks and Section 2 which contains restricted and extended response questions worth 90 marks. Section 2 is scaled to 60 marks.

The majority of marks available are awarded for applying knowledge and understanding. The remaining marks are awarded for applying scientific enquiry, scientific analytical thinking and problem solving skills. A variety of question types are used in the question paper, including:

- extended questions based upon an application of course content
- extended questions based upon practical/experimental work
- extended questions based on content not specified within the course, assessing skills
- extended questions based on content within the course, assessing skills
- open-ended questions
- extended questions assessing scientific literacy
- extended questions based upon course content
- multiple-choice questions

Component 2: Assignment

In the National 5 Assignment, candidates have to investigate a relevant topic in physics and communicate the findings of their research in a report. This topic must have a relevant application and an effect on the environment and/or society

The Assignment assesses the application of skills of scientific enquiry and related knowledge and understanding of physics.

Analysis of the results showed a spread of results across the range of marks available to candidates.

Section 2: Comments on candidate performance

Component 1: Question paper

The general impression of markers was that the question paper had an appropriate number of questions accessible to ‘C’ grade candidates. Markers also reported that the paper included appropriate questions to provide good discrimination for candidates performing at ‘A’ and ‘B’ levels.

Analysis of the question paper results showed that all questions were answered correctly by at least a proportion of the candidates and that there was a spread of performances across the range of available marks.

Some markers indicated that some answers they observed may suggest that some candidates had not prepared for the assessment or had been presented at the wrong level. However, the number of instances of this appeared to be fewer than in the previous year.

Generally, candidates' responses were better when answering questions involving numerical calculations and poorer when answering questions requiring justifications, descriptions and explanations.

Some markers commented on the lack of precision in the use of physics terminology in candidates' answers.

Component 2: Assignment

Markers commented that candidates had the opportunity to achieve marks for all of the skills and knowledge and understanding being tested. In addition, many markers commented that there was opportunity for candidates to achieve high scores.

Markers commented that the majority of candidates now appear to be following the advice available to them in 'Appendix 1: Instructions for Candidates', which details advice and guidance for the various stages of the Assignment, and the marks available for each aspect of the report.

Markers commented that the number of candidates who appeared to have a poor understanding of the requirements of the task was far fewer than in the previous year and that there were far fewer essay type responses. In these cases, markers made considerable efforts to give candidates credit when they could.

It was noted that candidates who had chosen an appropriate experiment/practical activity as one of their sources of data tended to perform well in the Assignment.

Markers also indicated that some candidates did not access all the marks available because of poor presentation.

Section 3: Areas in which candidates performed well

Component 1: Question paper

Section 1: Objective test

This section of the question paper seems to have been straightforward for most candidates. A majority of candidates answered at least 13 questions correctly.

Questions 1, 4, 5, 7, 10, 11, 12, 13 and 20 were answered particularly well (at least 70% of candidates selecting the correct response).

Section 2: Extended answers

Many candidates were successful with questions requiring the selection of a relationship followed by a calculation and final answer.

Candidates who successfully answered questions that required justifications, descriptions or explanations were able to structure their answers to present information which was clear and relevant to the question being asked. They used correct terms and references to appropriate physics theory (eg Newton's Laws of Motion).

- Question 1(a) and (b) Most candidates were able to obtain the majority of marks for drawing a correct circuit diagram and the ohm's law calculation was done well.
- Question 2(b)(i) and (b)(ii) Both calculations were well attempted by candidates, even though the first of these required a calculation in two stages.
- Question 3(c)(i) and (c)(ii) Again, these two calculations were well attempted by candidates.
- Question 5(a), (b) and (d) Most candidates demonstrated a good understanding of the terms 'angle of incidence' and 'angle of refraction' as well as what happens to the speed of light as it enters a different medium. Most candidates also made a good attempt at the pressure calculation, particularly with respect to the correct conversion of prefixed units.
- Question 6(a) and (c) Most candidates correctly stated the effect that the thickness of paper decreasing has on the count rate. Many candidates were also able to determine the half-life of the radioactive source from the graph of activity against time.
- Question 8(b) The majority of candidates were able to extract the required information from the velocity-time graph in order to correctly calculate the acceleration of the trolley.
- Question 11(a)(i) The calculation of gravitational potential energy was well attempted by most candidates.

Component 2: Assignment

Section 1: Statement of Aim

Most candidates were able to devise an appropriate aim for an investigation.

Section 2: Describe an application of Physics and explain its effect on the environment/society

Many candidates were able to access the second mark for explaining a clear relationship between the application and its effect on the environment/society.

Section 3: Select relevant sources

Many candidates started by stating that a source was relevant or reliable followed by a reasoned explanation, clearly indicating why it was relevant or reliable.

Section 4: Select relevant data/information from sources

Many candidates selected data which was relevant to the aim of the report. These candidates included the relevant raw data in their report and made clear statements about the sources of this data.

Section 5: Process and present data/information

(a) Processing of data/information

Some candidates provided two acceptable examples, in different formats, of accurately processed raw data from at least two sources.

(b) Presentation of data/information

Most candidates produced two satisfactory and **different** presentation formats which included sufficient detail to convey the data/information.

(c) Complete labelling of graphs, tables, charts or diagrams

Many candidates successfully achieved this mark because of the consistent, correct labelling of their presentation formats.

(d) Comparison of data/information from at least two sources

Some candidates successfully accessed this mark by comparing data from two sources in their report, or by making a clear statement that the two sources of data could not be compared.

Section 6: Drawing a valid conclusion

Successful candidates related their conclusion to their stated aim and also provided sufficient relevant data to support their conclusion within the report.

Section 7: Apply knowledge and understanding of Physics

Some candidates were able to access full marks for a clear explanation which demonstrated a good understanding of the physics involved. Many candidates were able to access the majority of marks by offering an explanation which demonstrated a reasonable understanding of the physics involved.

Section 8: Structure of the report

The majority of candidates were able to achieve most the marks available for this section. Most candidates provided an appropriate and informative title related to their report and, in general, candidates provided sufficiently detailed references to the sources, which would allow them to be retrieved by a third party.

Section 4: Areas which candidates found demanding

Component 1: Question paper

Section 1: Objective test

Questions 6, 16, 18 and 19 were answered incorrectly by over 50% of candidates.

In Question 6 a significant number of candidates failed to convert the temperatures stated in degrees Celsius to absolute temperatures on the Kelvin scale before attempting the calculation.

In Question 16 many candidates appeared to think, incorrectly, that no work was done in moving the car against friction.

In Question 18 a number of candidates appeared not to understand the effect of air resistance on the acceleration of the falling package when it reaches terminal velocity.

In Question 19 many candidates failed to take account of all the required unit conversions in order to calculate the distance stated in light-years to an equivalent distance in metres.

Section 2: Extended answers

Several question in this paper were of the 'must justify' or 'must explain' type. Some candidates did not identify the correct response to such questions and were therefore, as detailed in the Marking Instructions, unable to access any marks for their justifications. It should be noted that some of these questions were intended to assess the A Grade Criteria.

- Question 1(a): Many candidates were unable to draw the correct symbol for a battery (or a number of cells connected in series). Also, the poor presentation of circuit diagrams (eg wires not connecting to components) led to a number of candidates failing to achieve all the marks available.
- Question 1(c): Although many candidates attempted to justify a correct response, in their justification few correctly identified the key point that lamp M was in parallel with a resistor. In addition, there were many candidates who failed to achieve all the marks available because of imprecise use of physics terminology (eg phrases such as 'the voltage through the bulb' and 'the current going to the bulb' are not acceptable).
- Question 2(a): Some candidates identified the correct response to this question, but few were able to explain their choice. Although this type of question was perhaps unfamiliar to candidates, there appeared to be a poor understanding of the function of an LED in terms of current and voltage. This was particularly the case with respect to the significance of the voltage across the LED being negative.
- Question 3(a)(i): Many candidates were not able to relate the distances represented in the diagram to the times between the pulses being transmitted and received in the graph. It should be noted, however, that the other parts of this question were structured in such a way that candidates failing to identify the correct time would not lose marks for the same error in other parts.

- Question 3(a)(ii): Some candidates failed to understand the significance of the pulse being reflected in their calculation of the thickness of the steel sample (ie either to use half the time between the pulse being transmitted and received in their calculation of the distance, or to half the distance calculated having used the time between the pulse being transmitted and received). Also, some candidates failed to identify that the values of time on the graph were given in microseconds and therefore ended up with unrealistic values for the thickness of the steel sample.
- Question 3(c)(i): This is a 'show' type question and many candidates did not show all the required stages of the calculation to attract all the marks. These steps include starting with a correct equation, showing the correct substitutions and ending with the correct final value, including the unit.
- Question 3(d): Although most candidates correctly compared the value of the speed of sound in brass to that in steel, many did not provide a complete justification in terms of both the distance travelled by the pulse (or the thickness of the sample) and the time taken between it being transmitted and received.
- Question 4: Many candidates identified a difference in specific heat capacities as a possible reason for the different cooling rates of the blocks. Some also identified other possible factors, including where the blocks were situated, their geometry, and the possibility that one of them may have been insulated. However, not many went on to develop their answer to explain how these factors affected cooling rates of the blocks in any depth, to demonstrate a good understanding of the physics involved.
- Question 5(c): Only a minority of candidates recognised that the fact that diamond had the highest optical density would lead to it having the smallest angle of refraction.
- Question 5(d): In this question the values for both the force and the area are stated in the stem of the question to two significant figures. It is therefore appropriate to round the value calculated for the pressure to two significant figures. Even where a tolerance of one less or two more significant figures is applied to this answer (as is usual in physics) many candidates failed to gain the final mark in this question because they did not round their answer to an appropriate number of significant figures.
- Question 6(b)(i): This is a 'must explain' question and many candidates who did not identify the correct radioactive source (or even did not identify any source) for this application were unable to access any further marks for their justification.
- Question 6(b)(iii): Only a minority of candidates were able to correctly state what is meant by a gamma ray.
- Question 7(a)(i): Although most candidates attempted to solve this question using trigonometry, a significant proportion accompanied their answer with an incorrect vector diagram indicating a poor understanding of how to add forces as vectors. These candidates were not able to achieve all the marks available in this part of the question.
- Question 7(a)(ii): As in the previous part, a number of candidates accompanied their response to this part with an incorrect vector diagram and were unable to achieve all the marks available. In addition, a considerable number of candidates introduced either three-figure bearings or compass directions into their final answers, despite the fact that the stem of the question did not make any reference to either of these and specifically asked for direction relative to a particular force.
- Question 7(a)(iii): A number of candidates did not realise that they should use the resultant force calculated in the earlier part of the question as the unbalanced force in their calculation of the acceleration of the ship.
- Question 7(b): Many candidates did not identify that it was the forces on the ship that were significant in explaining why the ship floats. There seemed to be a significant

confusion between the balanced forces acting on the ship (Newton's First Law) and the action and reaction (or 'equal and opposite forces') between the ship and the water (Newton's Third Law). Although candidates were not required to draw a labelled diagram as part of their response (or to add to the one provided), candidates who did so tended to gain more marks, mainly due to the clarity in indicating the directions in which the forces act. In addition, candidates who were imprecise in their description of the forces acting on the ship (eg 'gravity' alone, rather than 'weight' or 'force of gravity', or 'buoyancy' alone rather than 'upthrust', 'force of water on boat' or 'buoyancy force') did not achieve all the marks available.

- Question 8(a)(i): Many candidates were not clear about which measurements must be made to calculate the acceleration of the trolley. Many candidates did not identify that the light gate was not at the bottom of the slope, therefore 'the time taken for the trolley to roll down the slope' was not an acceptable answer nor was the answer that it was the card that cut the beam, rather than the trolley itself.
- Question 8(a)(i): Few candidates identified a possible reason why the acceleration calculated might not be accurate; for example 'reaction time in measurement using the stop-clock' or 'the card did not pass through the gate straight'. The description provided by many candidates was not sufficiently detailed to allow the mark available to be awarded (eg 'its difficult to measure the time accurately by hand' or 'the length of the card could be wrong').
- Question 9(b)(i): A number of candidates who started the question with incorrect equations (eg $v=at$ or $v=gt$) were unable to access any of the marks available for this question. The fact that the initial vertical velocity of the stone is zero is significant and, where an equation is included, it should be correct (ie either $a=\frac{v-u}{t}$ or $a=\frac{\Delta v}{t}$).
- Question 9(b)(ii): Many candidates attempted to use the simple distance, speed, time relationship to calculate the distance the stone fell without understanding that the vertical velocity calculated in the previous part was the final vertical velocity of the stone, rather than the average. Therefore, they did not gain any marks beyond the first mark for the selection of a relevant formula. Candidates who performed well in this question tended to use other approaches, such as determining the area under a velocity-time graph or by using conservation of energy.
- Question 10: Many candidates attempted to answer this question by providing a list of benefits and/or risks of space exploration. Whilst some candidates qualified these lists with some description of the physics involved, few were able to develop their answer fully to demonstrate a good understanding. Those who did so were able to include statements of relevant physics principles and how they applied to space exploration, often just focusing on one or two of the risks/benefits.
- Question 11(a)(ii): Very few candidates identified the energy change that takes place as the marble hits the sand. Many candidates incorrectly stated this energy change as gravitational potential to kinetic.
- Question 11(b)(i): A number of candidates were careless in their choice of scales for the graph axes (eg providing non-linear scales or scales that were out by a factor of 10) preventing access to other marks. In addition, a number of candidates did not draw a suitable best fit curve for the graph and there were many examples of candidates incorrectly connecting data points in 'dot-to-dot' fashion.
- Question 11(b)(iii): The suggestions provided by many candidates were not sufficiently detailed to allow all the marks available to be awarded (eg 'take readings at other heights' does not sufficiently convey the concept of increasing the range).

- Question 11(c)(ii) Many candidates did not describe in sufficient detail how they would go about changing the variable they had selected in the previous part (eg 'I would change the mass of the marble by using different marbles' would be a sufficient response but 'I will change the type of sand ' is an insufficient description). In addition, many candidates did not describe controlling at least one of the other variables in their investigation.

Component 2: Assignment

Section 1: Statement of Aim

Although the vast majority of candidates gained the mark for providing a suitable aim for their Assignment, a significant number of them mentioned multiple aims in their statement.

Often in these cases, not all of the aims were investigated or referred to in the conclusion. This lead to a difficulty in accessing the conclusion mark later in the report.

Section 2: Describe an application of Physics and state its effect on the environment/society

Many candidates did not gain the first available mark because they did not provide an appropriate application and use a physics explanation to describe its characteristics and/or features. (For example. to state that 'a seatbelt provides a restraining force during a car crash' or that 'solar cells convert light into electrical energy'.)

Section 3: Select relevant sources

Many candidates did not provide a sufficient explanation for the choice of sources. For example, many stated ‘my source was relevant ’or ‘my source was reliable’ with no/insufficient explanation of why it was relevant or reliable.

A number of candidates did not use the words ‘relevant’ or ‘reliable’, making it unclear whether the candidate was referring to the reliability or relevance of the source. Some candidates did not understand the difference between relevance and reliability: answers such as ‘my first source was reliable because it contained information about my chosen topic’ were not uncommon.

Section 4: Select relevant data/information for inclusion in the report

Some candidates selected data that was not relevant to the aim of the report (for example, data on numbers of car accidents without any reference to seatbelt use.)

The relevant raw data must be included in the report and be clearly identifiable to allow subsequent access to marks in section 5. Several candidates did not make it clear what was relevant data or the sources of this data.

Some candidates selected sources of data that were hard to process (eg graphs without sufficiently detailed scales on axes or 3D bar charts where it was hard to ascertain values for the heights of the bars)

Section 5: Process and present data/information

(a) Processing of data/information

Many candidates did not present the information accurately enough to attract the relevant marks.

Some graphs were poorly drawn, with inaccurate scales and (particularly where they were not drawn on graph paper) inaccurate points. Some candidates were also unable to draw an appropriate lines or curves for their graphs.

When attempting to process data provided in graphs or charts into tabular form, some candidates stated unreasonably accurate values in their data given the raw data provided.

When candidates had produced pie charts, it was often the case that the data had not been processed correctly. This meant that the proportions of the sections of the pie chart were incorrect. The use of 3D pie charts as a presentation format by some candidates made it very hard for markers to ascertain their accuracy.

When candidates processed data by calculation there were a number of instances of the incorrect use of significant and/or inaccurate rounding.

When candidates processed their information in the form of a summary, often these were simply a generalisation or conclusion and were not detailed enough to allow the marks to be awarded.

(b) Presentation of data/information

Some candidates did not gain presentation marks because they used only one format or the same format for both presentations or they did not include a graph, table, chart or diagram for one presentation format.

Some candidates produced an inappropriate presentation format, eg a pie chart for a continuous variable.

(c) Complete labelling of graphs, tables, charts or diagrams

Some candidates did not achieve this mark because they did not label the relevant presentations completely.

(d) Comparison of data/information from at least two sources

Many candidates did not make any statement regarding a comparison of their data from two sources.

This was often due to the fact that they had chosen two (or more) disparate data sources that did not allow comparison, although a statement from the candidate to this effect would have been awarded marks.

There were also some candidates who made inaccurate statements about the comparison of their data (eg stating 'both my sources show that...' when, in fact, the data provided was not comparable.)

Section 6: Drawing a valid conclusion

Some candidates did not relate their conclusion to their stated aim. This was particularly the case when candidates had stated multiple aims earlier in their report but had not offered conclusions to all of these aims in this section.

In addition, there were cases where the data that candidates had provided elsewhere in the report did not support the conclusion.

Section 7: Apply knowledge and understanding of physics

Many candidates achieved one mark for demonstrating a limited understanding of the physics involved. Some candidates did not achieve marks for this section because they offered little or no relevant physics explanations and/or did not relate these to the application being discussed.

When candidates had selected topics for which the underlying physics was at a level above National 5, it was often hard for them to demonstrate either reasonable or good understanding of the physics involved.

Some candidates did not achieve marks because they had copied text verbatim from websites, text books or other sources.

Section 8: Structure of the report

Some candidates did not give an appropriate and informative title that related to the report content. The title ‘National 5 Assignment’ is not an appropriate or informative title.

Some candidates did not give sufficiently detailed references to the sources that would allow them to be retrieved by a third party. Truncated website addresses, such as www.bbc.co.uk, were quite common. When candidates had provided text references, these were often incomplete (eg lacking an edition number or a page number). When candidates had elected to process experimental data in their report, they often omitted to provide either a title or aim for the experiment as a reference.

Section 5: Advice to centres for preparation of future candidates

Component 1: Question paper

Each year, the question paper samples the content of each Unit of the Course in approximately equal proportions. This means that candidates should be familiar with all aspects of the Course.

Candidates sometimes did not give any answer to particular questions, which could suggest lack of familiarity with the content of the Course to which the questions referred. The question paper tests the application of knowledge and understanding, and the application of the skills of scientific enquiry, scientific analytical thinking and problem solving skills. Candidates should have the opportunity to practise these skills regularly to familiarise themselves with the type and standard of questions which may be asked.

Section 1 is worth 20% of the marks available for the Course assessment. At this level, candidates may spend too much time completing Section 1 of the question paper which then reduces the time left for completing Section 2, which is worth 60% of the marks. Candidates should practise objective test items for Section 1 and extended questions for Section 2 to ensure that they can complete them in a time proportionate to their mark allocation in the question paper.

Questions that require justifications, descriptions or explanations always feature in the assessment but are often answered poorly. These types of questions are frequently based on practical coursework and data obtained from experiments. Candidates should, where possible, have the opportunity to experience exposure to key practical work which may help to improve understanding of concepts, procedures and apparatus. Frequent exposure to the use of physics terms and ‘language’ may help candidates develop their communication skills when answering such questions.

Candidates should be made familiar with the various 'command words' used in physics questions and how to respond to them. For example, when candidates are asked to 'show' that a particular answer is correct they should start their response with an appropriate formula, show the correct substitutions and end with a final answer, including the correct unit, to obtain all the marks available. In a 'must justify' question, they must not only state or select the correct response but also provide supporting justification to attract any marks.

For questions requiring calculations, the final answer sometimes had the wrong or missing unit. Centres should remind candidates that a final answer usually requires both a value and a unit. Candidates should also be familiar with the full range of units used for quantities covered in the National 5 course.

In calculations, some candidates were unable to provide a final answer with the appropriate number of significant figures (or to round these correctly). It was evident that some confuse significant figures with decimal places. Centres should ensure that candidates understand and can apply the rules concerning significant figures.

Candidates should be given the opportunity to practise open-ended questions at appropriate points during the Course. They should be encouraged to not only state relevant physics concepts but also to relate them to the situation described in the question. Having attempted such questions, it may be beneficial for them to have sight of a range of responses and to discuss how marks would be awarded for these responses. Such responses can either be generated by their peers or are available from sources such as the SQA Understanding Standards website.

The published Marking Instructions contain general marking principles, and also detailed marking instructions for specific questions. Candidates should be encouraged to become

familiar with the allocation of marks and the importance of complete final answers when answering numerical questions. Candidates should have access to specific Marking Instructions when practising exam-type questions. The Marking Instructions published on SQA's website illustrate how marks are apportioned to responses.

Component 2: Assignment

There were some examples of reports that were little more than essays discussing a particular topic rather than a researched and reasoned scientific report. Such reports did not demonstrate application of the skills of scientific enquiry and related physics knowledge and understanding which the Assignment assesses. Candidates should be encouraged to produce a suitable scientific report and advised not to produce essays for their Assignment report.

It is important for candidates to receive the appropriate guidance when undertaking the Assignment. The 'Physics Assignment General Assessment information' document advises assessors to give reasonable assistance during the research stage which might include:

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

Also, at the communication stage of the Assignment, assessors may continue:

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

Centres are advised to give a copy of the 'Instructions for Candidates' which appears in Appendix 1 of the National 5 National Qualifications publication 'Physics Assignment Assessment task' to their candidates.

Centres should also share the Marking Instructions with candidates, so that they understand how marks are awarded. However, these should not be available to candidates when they are actually writing their report. Centres should not provide a pro-forma that directs candidates to complete specific sections of the report.

Presentation of the report

Many successful candidates presented their report in the order of appearance of each section. This meant that interpretation of the report was sequential and easy to follow. Many candidates placed helpful headings before each section of the report to help identify each section.

Some candidates did not gain marks because the structure of their report was not in any sequence. This meant that some of the sections were difficult to identify. Candidates should be encouraged to follow the structure outlined in the Candidates' Guide.

When candidates use word processing packages to produce reports, they should take care to clearly identify those parts of the report that contain raw data from their sources and those that they have produced themselves.

Choosing the topic for research

Centres can offer advice to candidates on the choice of topic or issue for research. Generally, appropriate topics:

- related to content of one or more of the Course Units
- were at a level of understanding consistent with National 5
- included sources of data and data itself which were understandable at National 5 level and could be processed by the candidate

However, less appropriate topics:

- had limited or no published data, making it difficult to achieve marks for later sections of the report
- required an understanding of physics at a level greater than National 5, causing some marks, for example the underlying physics, to be unattainable

Centres should encourage candidates to choose topics that lend themselves to the type(s) of data processing and presenting that is assessed in the Assignment, and advise against researching topics for which little or no data can be accessed. Centres should also consider taking an approach where candidates can include and compare their own experimental data with literature research, rather than simply pure literature research.

Statement of Aim

Successful statements of the aim related to relevant research data within the report and to the conclusion. Some candidates stated an aim which did not relate to the data or to the conclusion. Statements of multiple aims should be avoided.

Description of an application of physics and its effect on the environment/society

Successful candidates achieved both marks by:

- Describing an application for their research, and providing an explanation of its characteristics and/or its features. This explanation could include a brief discussion of the physics involved to describe how the application works or is achieved.
- Making a clear statement of the relationship between the chosen application and its effect on the environment or society. The stated relationship can be positive or negative, depending on the application.

Centres should advise candidates on the suitable choice of topics to allow these marks to be accessed.

Select relevant sources

Successful candidates explained their choice of sources by:

- Stating whether the source was relevant, followed by their explanation of why this was the case, which included some detail of what information was contained in the source.
- Stating whether the source was reliable, followed by their explanation of why this was the case.

Successful candidates also chose to accompany the source selection explanation with identification of the source of the information. (Many candidates included full URLs or text book references at this stage).

Centres should encourage candidates to follow the guidance above, which is also contained in the Candidates' Guide, and ensure that candidates understand what makes a source relevant and/or reliable.

Select relevant information from sources

Successful candidates selected and presented relevant information (data) from at least two different sources clearly, and indicated which source the data had come from.

It should be emphasised to candidates that this data should come from two different sources and that two pieces of data from the same source (eg the same web domain or same text book) will not be awarded all the marks available.

The data selected from each source should be unprocessed by the candidate and clearly identified as source data. The source data should be 'raw' data. Candidates often clearly demonstrated this by attaching printed copies of the raw data to their report rather than transcribing the data.

Candidates who did not present any raw data at this stage were not able to access marks for the next processing stage because the accuracy of the processing could not be verified, unless the source of the data could be accessed.

Centres should remind candidates that they must include the raw data from their sources in the report.

Processing information

Successful candidates were able to process the information accurately in the chosen presentation format by:

- Using graph paper to draw graphs and ensuring that appropriate scales were used and that data points were plotted accurately, and correctly selecting whether to connect points on graphs in dot-to-dot fashion or attempting to draw a best fit line or curve.
- Ensuring that, when using Excel or other software packages to draw graphs, the appropriate type of graph was selected, as well as making sure that the accuracy of the data points could be ascertained by markers (eg by using small data points and including minor gridlines).

- Ensuring that at least one sample calculation was shown, together with the correct units when processing data by calculations and that an appropriate number of significant figures were used and rounding these figures correctly.
- Making sure that any summaries provided 'painted a picture' of the data rather than being a simple generalisation or conclusion. Accurate summaries also included correct units for any quantities stated.
- Making sure that values extracted from graphs or charts were realistically accurate given the raw data provided.

Candidates should be made aware that the standards applied for the accuracy of processing information in the Assignment are the same as they are for the question paper.

Note that candidates who did not select relevant information in the previous stage would not be able to access these processing marks unless the source of the data could be accessed.

Presenting information

Successful candidates chose at least two appropriate and different formats to present the processed data. An indication or heading was useful in identifying each presentation format.

Centres should ensure that candidates are able to choose an appropriate presentation format for the type of data being presented.

Candidates should be reminded that they must use two different presentation formats (eg a line graph and a bar chart and not two line graphs) and that one of these presentation formats must be a graph, table, chart or diagram.

Labelling of graphs, tables, charts or diagrams

Successful candidates achieved a mark for including appropriate units, headings and labels for all of the presented and processed data. Candidates who omitted, for example, to label axes or include table headings failed to achieve this mark.

Centres should advise candidates to check thoroughly that they have included all appropriate units, headings and labels for all of their presented, processed data. These should be consistent with the raw data provided.

Comparison of the data from at least two sources

Successful candidates compared the data from at least two different sources, whether processed or unprocessed, and commented, where appropriate, on any similarities or differences or that no comparison could be made between the sources.

In advising candidates on the choice of research topic, centres should encourage candidates to select topics that lend themselves to sourcing data which can be compared.

Drawing a valid conclusion

Successful candidates accessed this mark by providing a conclusion that related to the aim and supported this conclusion with relevant evidence within the report.

Given that some candidates did not state a valid conclusion because it only related to one part of their stated aim, centres should advise candidates not to be 'over ambitious' with the aim of their Assignment and to avoid multiple aims.

Apply knowledge and understanding of physics

Successful candidates were able to access these marks by showing a good comprehension of the research and application, and providing an explanation that included a discussion of some of the physics involved at a depth appropriate to National 5.

Again, careful advice on the choice of topic is essential here. Many candidates may wish to choose an area that really interests them. However, it was clear that some chose topics for which the underlying physics was well above National 5 level. Consequently, they struggled to explain the physics or ended up copying verbatim from references.

Structure of the report

Successful candidates who achieved all available marks:

- had a heading or title at the start of the report
- included at least two references to the sources used in the report in sufficient detail to allow them to be retrieved by a third party
- produced a report that was clear and concise

Some candidates did not access all marks because:

- they did not include an appropriate heading or title at the start of the report
- they did not provide at least two references to the sources used in the report in sufficient detail to allow them to be retrieved by a third party
- they provided references which were incomplete
- their report was not clearly or logically presented, making it difficult to identify each section of the report
- their report was not concise and contained great amounts of written text which was not relevant to the aim of the research

Centres should ensure that candidates know what is meant by 'in sufficient detail to allow them to be retrieved by a third party' — ie it must be the full URL for a website, or for a text book it should have title, author, page number, and either edition number or ISBN.

Statistical information: update on Courses

Number of resulted entries in 2014	11932

Number of resulted entries in 2015	14942

Statistical information: Performance of candidates

Distribution of Course awards including grade boundaries

Distribution of Course awards	%	Cum. %	Number of candidates	Lowest mark
Maximum Mark - 100				
A	28.9%	28.9%	4321	68
B	23.3%	52.2%	3485	58
C	21.8%	74.1%	3261	48
D	8.5%	82.6%	1272	43
No award	17.4%	-	2603	-

For this Course, the intention was to set an assessment with grade boundaries at the notional values of 50% for a Grade C and 70% for a Grade A. For Q2(a), 1 mark was intended to function as an 'A' mark. The 2nd mark was non functioning and therefore not accessible. A 1 mark adjustment was made for the C, A and upper A boundaries. For Q9(b)(i) 1 mark was intended to be a 'C' mark, however neither the 'C' candidates nor the 'A' candidates were accessing this mark, therefore a 1 mark adjustment was made at the C and A boundaries.