Course report 2024

Higher Physics

This report provides information on candidates' performance. Teachers, lecturers and assessors may find it useful when preparing candidates for future assessment. The report is intended to be constructive and informative, and to promote better understanding. You should read the report with the published assessment documents and marking instructions.

We compiled the statistics in this report before we completed the 2024 appeals process.

Grade boundary and statistical information

Statistical information: update on courses

Number of resulted entries in 2023: 7,997

Number of resulted entries in 2024: 8,064

Statistical information: performance of candidates

Distribution of course awards including minimum mark to achieve each grade

A	Number of candidates	2,331	Percentage	28.9	Cumulative percentage	28.9	Minimum mark required	105
B	Number of candidates	1,922	Percentage	23.8	Cumulative percentage	52.7	Minimum mark required	89
C	Number of candidates	1,851	Percentage	23.0	Cumulative percentage	75.7	Minimum mark required	73
D	Number of candidates	1,192	Percentage	14.8	Cumulative percentage	90.5	Minimum mark required	57
No award	Number of candidates	768	Percentage	9.5	Cumulative percentage	100	Minimum mark required	N/A

We have not applied rounding to these statistics.

You can read the general commentary on grade boundaries in the appendix.

In this report:

- ‘most’ means greater than 70%
- ‘many’ means 50% to 69%
- ‘some’ means 25% to 49%
- ‘a few’ means less than 25%

You can find statistical reports on the statistics and information page of our website.

Section 1: comments on the assessment

Question papers

Feedback from teachers, lecturers and candidates indicated that they felt the papers were fair and accessible.

Both question paper 1 and question paper 2 performed as expected.

An adjustment was made to the C-grade boundary for question 2(a)(i), as it was considered not to have functioned wholly as intended.

Some candidates were unable to answer questions that related to practical work, including questions related to particular experiments detailed in the Higher Physics Course Specification, which is available on the Higher Physics subject page. While it was clear that some candidates had participated in a range of practical work, it appeared that others had little or no experience of practical work, and had therefore not developed the necessary knowledge and skills.

Questions testing recall of facts and definitions continued to be poorly done.

Assignment

The assignment performed in line with expectations, with the marks awarded aligning closely with performance in 2019.

No adjustments were made to grade boundaries for this part of the assessment.

Section 2: comments on candidate performance

Areas that candidates performed well in

Question paper 1

Question 1	Most candidates were able to calculate the distance travelled by the cyclist.
Question 5	Many candidates were able to determine the total power delivered by the water.
Question 6	Most candidates were able to determine the velocity of the trolleys immediately after the collision.
Question 7	Most candidates were able to calculate the duration of the signal measured by an observer on Earth.
Question 8	Many candidates were able to calculate the length of the Queensferry Crossing as measured by an observer on a spaceship.
Question 9	Many candidates were able to identify the correct statements about the stars.
Question 10	Most candidates were able to identify that a muon is a fermion.
Question 11	Most candidates were able to identify that beta decay provided the first evidence for the existence of the neutrino.
Question 13	Most candidates were able to determine the energy released in the reaction.
Question 14	Most candidates were able to identify that repeating the experiment in a darkened room would reduce the systematic uncertainty.
Question 15	Most candidates were able to identify the correct statements about coherent waves.
Question 16	Many candidates were able to select the correct explanation for the absorption spectrum.
Question 17	Most candidates were able to calculate the speed of the light in diamond.
Question 18	Most candidates were able to determine the potential difference across the 60 Ω resistor.
Question 19	Most candidates were able to calculate the potential difference across a resistor, given its resistance and power rating.

Question 20	Many candidates were able to identify the correct statements about the circuit.
Question 21	Most candidates were able to calculate the energy stored in the capacitor.
Question 22	Many candidates were able to identify the correct current-time graph for the charging capacitor.
Question 23	Most candidates were able to identify the materials correctly.
Question 24	Most candidates were able to identify the effect of an increase in temperature on a semiconductor.

Question paper 2

Question 1(a)(i)(A)	Most candidates were able to calculate the horizontal component of the initial velocity of the ball.
Question 1(a)(i)(B)	Most candidates were able to calculate the vertical component of the initial velocity of the ball.
Question 1(a)(ii)	Most candidates were able to calculate the horizontal distance travelled by the ball.
Question 1(b)(i)	Most candidates were able to calculate the frequency of the sound heard by student B.
Question 1(b)(ii)	Many candidates were able to explain how the foam ball protects the circuit board during a collision.
Question 2(b)(i)	Most candidates were able to show the acceleration of the car correctly.
Question 2(b)(ii)	Many candidates were able to determine the minimum forward force produced by the car while accelerating.
Question 2(c)	Many candidates were able to determine the tension in the coupling between the car and caravan. Those that attempted the question and were unable to determine the tension in the coupling either stopped after having calculated the unbalanced force or used the incorrect mass.
Question 4(a)(i)	Most candidates were able to compare the mass of the Earth with the mass of Didymos in terms of orders of magnitude correctly.
Question 4(a)(ii)	Most candidates were able to calculate the gravitational force between Earth and Didymos. A few candidates ‘dropped’ the square sign at the substitution stage, and a few used the value for g rather than G.

Question 4(b)(i)	Most candidates were able to calculate the maximum kinetic energy transferred from DART to Dimorphos. Although well done by most candidates, markers reported that a few candidates either omitted the square sign at the substitution stage or forgot to square the value for v when calculating the kinetic energy.
Question 5(a)(i)	Many candidates were able to determine the wavelength of the light represented by the students.
Question 6(a)(ii)	Most candidates were able to calculate the maximum speed of an electron as it reaches the anode.
Question 6(a)(iii)	Many candidates were able to calculate the maximum acceleration of an electron between the cathode and the anode.
Question 8(a)	Many candidates were able to use all of the data to establish the given relationship. Of those who did not, the issues tended to be that they either only did the calculations and did not conclude how that showed the relationship, or they did not do a calculation for all the pairs of data points.
Question 8(c)(i)	Most candidates were able to determine the mean value for d.
Question 8(c)(ii)	Most candidates were able to calculate the random uncertainty in the mean value for d.
Question 8(c)(iii)	Many candidates were able to use the given relationship to determine the luminosity of the Sun. Again, a common issue reported by markers was that some candidates either omitted the square signs at the substitution stage or did not square the values once substituted.
Question 9(a)(i)	Most candidates were able to calculate the energy of a photon of the UV radiation.
Question 10(a)	Most candidates were able to calculate the wavelength of the sound produced by the speakers.
Question 10(b)	Many candidates were able to show by calculation that destructive interference was detected at point P.
Question 11(a)(i)	Most candidates were able to determine the number of possible emission lines caused by electron transitions between the energy levels shown.
Question 11(b)(i)	Most candidates were able to determine the wavelength of the photon of light emitted for the electron transition identified.
Question 11(b)(ii)	Many candidates were able to state the colour of light produced by using information on the data sheet.

Question 12(b)	Most candidates were able to calculate the critical angle for Perspex for the light from the laser.
Question 13(b)	Most candidates were able to determine the rms voltage of the signal.
Question 13(c)	Most candidates were able to determine the timebase setting on the oscilloscope.
Question 15(a)	Most candidates were able to calculate the total resistance for the part of the circuit shown.
Question 15(b)(i)	Many candidates were able to name the photovoltaic effect.
Question 16(a)(i)	Many candidates were able to draw a graph of the data as instructed. There were some common issues with the drawing of the graphs. These included choosing awkward scales that made it difficult to plot the points accurately or forcing the line of best fit through the origin. Some candidates missed that the unit for the extension data was given in millimetres. A few candidates did not follow the instruction to plot F against e and swapped the axes to plot e against F. While that did not impact on the marks awarded in this part, they made it considerably more difficult for themselves to access marks in part (ii).
Question 16(b)	Many candidates were able to use the given relationship to determine the elastic potential energy stored in the spring. However, a few candidates did not convert the extension in millimetres to metres, despite the question stating clearly that the extension in the relationship should be in metres.

Assignment

Aim

Most candidates were able to state an aim that clearly described the purpose of their investigation. For the few candidates who did not gain this mark, the issue tended to be that their aim lacked specificity.

An account of physics relevant to the aim of the investigation

Many candidates were able to demonstrate at least a reasonable understanding of the physics relevant to their investigation. There were a few instances where candidates did assignments on topics that were either at National 5 level or lower, or experiments that were more suited to an Advanced Higher project. In the case of the former, candidates often struggled to include any physics that was at Higher level. In the case of the latter, it was often evident that the candidates did not understand the physics behind the experiments. Centres must make sure that experiments are appropriate for Higher.

Sufficient raw data from the candidate's experiment

Most candidates included sufficient raw data from their experiment. Where candidates did two experiments, at least one met the criteria for this mark to be awarded.

Data relevant to the experiment from an internet/literature source or data relevant to the aim of the investigation from a second experiment

Most candidates included either data relevant to their experiment from an internet or literature source or data relevant to their aim from a second experiment. For the few candidates who did not achieve this mark, it tended to be because the data they included from an internet or literature source was not relevant to their experiment. For example, they included a data book value for a constant rather than including data that could be compared to their own experimental data.

The axes of the graph have suitable scales

Most candidates were able to produce graphs that had suitable scales.

The axes of the graph have suitable labels and units

Most candidates were able to produce graphs that had suitable labels and units.

Scale reading uncertainties and random uncertainties

Most candidates were able to give either appropriate scale reading uncertainties or random uncertainties. However, only some candidates were able to give both. It was quite common for the scale reading uncertainties being quoted not to match the level of precision quoted for the measurements. For example, measurements quoted to 0.1 of a division but scale reading uncertainty quoted as 0.5 of a division. Some candidates included a scale reading uncertainty for one of their measured quantities but not both.

A clear and concise report with an informative title

Most candidates produced clear and concise reports and included an informative title. There were far fewer instances of the title being 'Higher Physics Assignment' than previously observed.

Areas that candidates found demanding

Some candidates had more difficulty with questions that asked about practical work, which indicated a lack of experience and familiarity with undertaking experiments, including those detailed in the course specification.

Another issue, which has been identified in previous course reports, was the need to learn definitions.

The standard of writing and literacy was often poor. In some questions, candidates used language that lacked the necessary precision.

Question paper 1

Question 2	Some candidates were able to identify the appropriate displacement-time graph. Many were aware that it should be a curve but opted for either option B or option D rather than the correct response.
Question 3	Some candidates were able to determine the tension in the rope.
Question 4	Some candidates were able to select the correct graphs for the motion of the ball when air resistance was taken into account. Some candidates selected graph Z for the vertical component of the velocity, indicating that they thought the acceleration would increase.
Question 12	Some candidates were able to determine the nucleus produced as a result of the decay series.
Question 25	Some candidates were able to identify the LEDs in the circuit that would emit light.

Question paper 2

Question 1(a)(iii)	Some candidates were able to determine the height h between student B and the ball. The most common issues for this question were either mixing up sign conventions (making both u and a positive or both negative) or attempting to use the relationship $s = \frac{1}{2}(u+v)t$. This question was intended to be demanding.
Question 2(a)(i)	Some candidates were able to determine the component of the weight acting down the slope. Many candidates started with an inappropriate relationship, identifying it was the weight they were calculating rather than the component of the weight.
Question 2(a)(ii)	Some candidates were able to determine the forward force produced by the car. Many candidates subtracted the friction from their answer to (a)(i) rather than adding the friction and component of weight.
Question 2(b)(iii)	Few candidates could state an appropriate assumption about the calculation in (b)(ii). Candidates commonly responded that the assumption was that friction/air resistance was negligible or that, as stated in the question, acceleration was constant/uniform.
Questions 3 and 7	The open-ended questions performed very much as they have done in previous exams. Answers for both ranged from very good to very poor. It was noted that more candidates did not attempt question 3 compared to question 7, and the quality of response was better for question 7. Some candidates did not answer the actual question being asked and simply gave everything they knew about collisions for question 3 or the Standard Model for question 7. These questions are intended to be demanding.

Question 4(b)(ii)	Some candidates completed the sketch graph of force against time for the collision. However, candidates' graphs often lacked the necessary precision to be awarded the mark. In particular, lines often extended below the time axis, or curves went 'backwards in time'. Teachers and lecturers should remind candidates that sketch graphs must be drawn neatly and with appropriate precision.
Question 5(b)	Although many candidates were able to identify which direction the 'star' was moving, only some could provide an appropriate justification for their choice. Responses often lacked precision, with answers stating or implying that the 'star' was now emitting light with a longer wavelength rather than the observed wavelength being greater, or that the wavelength was 'increasing' (with time). This was intended to be a demanding question.
Question 5(c)(i)	Some candidates were able to state what Olbers' paradox is, but few could explain how it supports the concept of the expanding Universe. This was intended to be a demanding question.
Question 5(c)(ii)	Some candidates could state one other piece of evidence that supports the concept of the expanding Universe. Many simply restated 'redshift', which was given in the stem of the question.
Question 6(a)(i)	Few candidates could draw the electric field pattern between the parallel plates. Many candidates' drawings lacked the appropriate accuracy or precision. Some drew lines that were not (approximately) parallel or perpendicular to the plates. Some extended their lines into the cathode and anode or started their lines away from each. However, the main issue was that many drew the direction as being from cathode to anode, rather than the correct direction.
Question 6(b)	Some candidates could determine the direction of the magnetic field. A common incorrect response was 'up' or 'upwards' instead of 'out of the page'.
Question 8(b)	Some candidates could suggest why small, spherical lamps would be used in the experiment.
Question 9(a)(i)	Some candidates could explain why UV radiation of given frequency produced a current in the circuit. Although many were able to identify that the energy of the photons was greater than the work function (or frequency greater than the threshold frequency), few could go on to explain how the photoelectrons were attracted to the positive wire mesh to complete the circuit. The second part of the answer was expected to be demanding.
Question 9(b)	Some candidates were able to state that the effect of moving the UV lamp closer to the quartz window would be an increase in the current

and explain that there would be more photons incident per second on the plate. This was expected to be a demanding question.

Question 9(c)	Some candidates were able to state the effect on the current of reversing the polarity of the supply. However, few were able to explain why this happened. Some answered that the current would now go in the opposite direction because electrons would be emitted by the platinum mesh and be attracted to the zinc plate.
Question 10(c)	Some candidates were able to state the effect on the amplitude of the sound caused by disconnecting one of the loudspeakers, and were able to justify their response appropriately.
Question 11(a)(ii)	Some candidates were able to identify the electron transition that would result in the emission of a photon with the shortest wavelength. Common incorrect responses were not to include an indication of the direction of the transition or to have it the wrong way round.
Question 11(c)	Despite much the same question having been asked in the 2023 paper, few candidates could explain why the red emission line was brighter than the others.
Question 12(a)	Few candidates could suggest how the student's measurements should be processed to find a reliable value for the refractive index of Perspex in the experiment. Many candidates suggested an approach that would involve the invalid averaging of individually calculated values of n. Given that this experiment is one of the ones required in the course specification, candidates should know that the correct approach is to graph $\sin i$ against $\sin r$ and determine n from the gradient. This experiment was a common one seen in assignment reports, where candidates did as expected to produce the correct graph and calculate the gradient.
Question 12(c)	Despite the question being constructed to lead candidates through it (by calculating the critical angle in part (b)), only some candidates could draw the light reflecting inside the block and mark the angle as 50º. Many candidates drew the ray refracting out of the Perspex block at the straight edge and a few drew it 'reflecting' from the normal.
Question 13(a)	Few candidates could give a correct definition of alternating current (AC). Many candidates talked about the current changing direction but did not state that the instantaneous value changes with time.
Question 14(a)(i)	Some candidates were able to use the graph to determine the internal resistance of the battery. Despite the question being structured to show how the relationship mirrors the equation of a straight line, and having been asked in this way before, many candidates simply assumed that the gradient = $-r$.

Question 14(a)(ii)	As with the previous part of the question, only some candidates could determine the EMF of the battery. Many assumed that the EMF was the y-intercept.
Question 14(a)(iii)	Slightly more candidates were able to determine the short circuit current than could determine either the internal resistance or the EMF of the battery.
Question 14(b)	Few could identify that the short circuit current would have the same value or justify why that was the case. This was intended to be a demanding question.
Question 15(b)(ii)	Some candidates could use band theory to explain how a potential difference is produced by a solar cell when light is incident on the p-n junction. Some candidates did not read the question carefully and instead explained how an LED produced light.
Question 16(a)(ii)	Few candidates could use their graph to determine the spring constant. Although some realised that the spring constant was equal to the gradient, they did not convert mm to m, chose data points that did not lie on the line of best fit, or quoted the gradient relationship using powers rather than subscripts. Those that had missed the instruction in (a)(i) to plot F against e and instead plotted e against F, often stated that k = gradient rather than $k = \frac{1}{gradient}$
Question 16(a)(ii)	Few candidates could suggest an improvement to the experimental procedure that would improve the accuracy of the results. Most gave responses that would affect the reliability or the precision of the results, rather than the accuracy. It is important that candidates learn the difference between these terms.

Assignment

Data, including any mean and/or derived values, presented in correctly produced tables

Although this should be a straightforward mark to achieve, only some candidates were able to present their data correctly. Common issues included mistakes in calculating mean and/or derived values, columns with missing or inappropriate headings (for example, 'mean' rather than 'mean voltage'), and columns with missing units. A few candidates had inconsistencies in the precision to which they quoted their measurements; for example, some values quoted with no decimal places and others with one or two decimal places. All values should be quoted to the same precision (as displayed on the measuring instrument), for example, 2.00 and 3.45, not 2 and 3.45.

A citation and reference for a source of internet/literature data or information

Some candidates were able to cite and reference their secondary source of data (where they were conducting one experiment), or cite and reference a source for their underlying physics (where they were conducting two related experiments). At this level, candidates do not need to use a formal citation and referencing system, but it was encouraging to see that a notable proportion of those that gained the mark used a Vancouver-style system. Common errors included using a full URL as the citation, which is never appropriate, missing the date of access when referencing websites, and missing page numbers when referencing a book.

Accurately plotted data points and, where appropriate, a line of best fit

Only some candidates were able to plot points with sufficient accuracy or draw the appropriate line of best fit. Common issues included lines of best fit that were forced through the origin, lines of best fit where the candidate had simply drawn a line from the first point to the last point (this is seldom likely to be the line of best fit), and choosing awkward scales that made it very difficult for them to plot points accurately. Some candidates chose to use graphing software, which is acceptable, but made the graphs too small to check the accuracy of plotting. A few omitted to include minor gridlines or used the large default Excel points, which also meant the accuracy of plotting could not be checked. A few candidates drew straight lines of best fit when the data points showed a clear curve.

Analysis of experimental data

Some candidates were able to analyse their experimental data appropriately. Those that carried out meaningful calculations were much more likely to gain the mark than those that tried to analyse their data descriptively. Often, their descriptions were not at the correct level for Higher Physics. However, some candidates chose to do calculations that had no real meaning or having calculated a value, did not communicate its significance. A few candidates carried out invalid averaging. For example, they calculated a value for g for each data point and then averaged the values they had calculated. Candidates should be aware that the correct way to analyse such data is to determine the gradient of the line on their graph (assuming it is a straight line) and use the gradient to determine the quantity being investigated. At Higher level, mathematical analysis is better than wordy descriptions. Candidates must show their calculations or a sample calculation.

A valid conclusion that relates to the aim and is supported by all the data in the report

Some candidates were able to state a valid conclusion supported by all the data in their report. A common issue was candidates basing their conclusion on only one set of data in the report. This was typically their experimental data, and they ignored their secondary data, although there were a few instances where the candidate based their conclusion on the secondary data and ignored their experimental data. This issue tended to be less frequent when the candidate had taken the two-experiment option. Other issues included candidates claiming direct proportionality when their best fit line did not pass through the origin, although for candidates who had analysed their results by calculating appropriate uncertainties, such a conclusion may have been appropriate within the range of their uncertainties. A better approach is to advise candidates to use the terminology ‘linear relationship’, as that can be applied to any best fit straight line whether it passes through the origin or not. A few candidates claimed incorrectly that curves confirmed direct proportionality or that they confirmed the relationship or law being investigated.

Evaluation of the investigation

Few candidates were able to give more than one evaluative statement with appropriate justification. Evaluation is a higher order skill and is therefore expected to be demanding.

Common issues included no or incorrect justifications for their suggestions. In some cases, the suggestions being made would have made no difference to their measurements or results. For example, some suggested that they should have repeated the measurements more times when there was little or no variation in the measurements they had made. Some candidates are still mixing up the terms accuracy, precision and reliability. There is no requirement for candidates to use these terms in their report, but if they do, they must use them correctly.

Section 3: preparing candidates for future assessment

Centres are reminded that Higher Physics is a practical course that requires the development of knowledge, understanding and skills related to practical work.

Candidates must be given the opportunity to take an active part in a wide range of practical work throughout the course, including opportunities to evaluate and analyse, to develop the necessary knowledge and skills. While demonstration of experiments, videos and computer simulations may be useful additional tools, they cannot replace active experimental work and do not develop the knowledge and skills associated with practical work.

Opportunities to regularly practise experimental skills during classwork should enable candidates to answer questions assessing aspects of experimental technique and analysis of experimental data. It should also enable candidates to improve their performance in the assignment.

Centres are reminded that in the assignment, teachers and lecturers must ensure a range of topics is available for candidates to choose from and that they must minimise the number of candidates in a class investigating the same topic. For example, in a class of 20 and given that candidates can work in groups of up to four, there should be a minimum of five different topics available, with each group investigating one of the topics. While it was evident that some centres offered up to seven or eight different topics and ensured each group in a class was investigating a different topic, others offered only two or three and had not minimised how many in a class were investigating the same thing. For clarity, a topic is something such as internal resistance or refractive index. Having groups in the same class investigate the refractive index of different materials would still mean that the groups were investigating the same topic.

Question paper

Candidates should be encouraged to learn the definitions required for Higher Physics.

Candidates should be encouraged to read the questions carefully and answer the question that is being asked.

Candidates should be encouraged to make their handwriting as clear as possible.

Candidates should be made aware that when asked to sketch a graph or complete a diagram, this requires both accuracy and precision in their response. They should be aware that when drawing straight lines a ruler should be used.

Candidates should be strongly discouraged from copying down answers from their calculator containing a large number of significant figures, or using ellipses, as a penultimate stage in their response before stating their final answer, as this can often introduce transcription or rounding errors into their calculations. They should be strongly encouraged to show only the selected relationship, the substitution, and then the answer, including units, to the appropriate number of significant figures.

Candidates should be discouraged from rounding at the intermediate stage of a calculation, as this can result in their response not being one of the acceptable values.

Centres should ensure that candidates are aware that they should follow sign conventions through to the end of calculations and that it is not acceptable to drop negative signs in the middle of a calculation.

Candidates should be encouraged to take care in questions involving squaring of quantities (or other powers) that they include the power at the substitution stage as well as in the relationship, and that they carry out any squaring when calculating the final answer. It was more noticeable this year than previously that candidates were omitting these things.

In the examination, candidates should also be encouraged to refer to the data sheet and the relationships sheet, rather than trying to remember data and relationships. A concerning trend has been that, despite the relationships sheet showing the correct use of subscripts or superscripts, candidates are changing subscripts to superscripts (powers) in relationships, resulting in the relationship being incorrect. For example:

$$\frac{V^1}{V^2} = \frac{R^1}{R^2}$$

Markers cannot give credit for this.

Candidates should be able to correctly describe the operation of solar cells and not just that of LEDs.

Candidates should know the difference between emission and absorption spectra and how they are produced. When comparing the brightness of lines in a line spectrum, candidates should be able to state that the brightness of a line is related to the number of electrons making a particular transition per second, hence producing that number of photons per second.

For questions relating to experimental determination of EMF and internal resistance, candidates should be familiar with both approaches that have featured in exam papers.

Candidates should be given opportunities to practise their mathematical and drawing skills when considering the path of a ray of light through a transparent object. This should include cases where total internal reflection occurs.

Candidates should be given opportunities to analyse uncertainties associated with experimental data. Candidates should be given opportunities to determine the gradient of graphs derived from practical work and then use the gradient to find physical constants. When carrying out practical work, candidates should be given opportunities to discuss practical improvements to their experiments.

Centres should refer to the Physics: general marking principles document on the Higher Physics subject page for generic issues related to the marking of question papers and assessments. Centres must adopt these general instructions for the marking of prelim examinations and centre-devised assessments for any SQA Physics courses.

Assignment

Centres must ensure that the range of topics being offered is sufficient and that the topics are at an appropriate level for Higher. Whole classes or cohorts, or a significant proportion of a class, investigating the same topic is not acceptable. Offering Higher candidates topics at National 4 or National 5 level, or even Advanced Higher level, can disadvantage them in the marks they are awarded. The experiments can be standard ones from the Higher course and do not have to be unfamiliar or from outwith the course.

Centres must give candidates the 'Instructions for Candidates' from the Higher Physics Course Assessment Task document, which is available on the [Higher Physics subject page](). Centres must not alter or add to the content of these instructions.

Centres should ensure that if candidates are only conducting one experiment, they have an opportunity to find data from internet or literature sources that is relevant to their experiment.

Centres are encouraged to give candidates opportunities to take part in a wide range of practical work before choosing a topic for investigation.

Centres should ensure that candidates can cite and reference their sources correctly. While a formal citing and referencing system isn't required, candidates should be strongly encouraged to follow a system such as the Vancouver referencing system.

Centres should ensure that candidates have frequent opportunities to produce graphs from experimental data and analyse the data from the graphs. Where graphing software is used, centres should ensure that candidates know how to use it correctly.

Candidates should be made aware that they need to conclude all of their data, both practical and literature. Where a candidate's experimental data does not agree with their literature data, their conclusion should reflect this.

Centres should advise candidates to use the term 'linear relationship' when their graph results in a best fit straight line. This avoids problems around whether lines show direct proportionality or not.

Centres should ensure candidates understand that a best fit curve on a graph cannot be used to confirm a relationship or law. More appropriate quantities that result in a straight line of best fit would have to be plotted.

Centres should ensure that candidates are given opportunities to develop the necessary skills to evaluate their data and experimental procedures.

In preparation for the report stage of the assignment, teachers and lecturers must check the materials that the candidates have gathered, to ensure that they do not have prohibited items. For example, while candidates can take in a table of their raw data, this must not have blank columns ready for the candidate to fill in, partially completed columns with headings and units, or mean and derived values already calculated, such as the sine of the angles in a Snell's Law experiment. Extracts from internet or literature sources must not have sample calculations included. Teachers and lecturers must refer to the course assessment task document to ensure that the conditions of assessment are understood and applied.

Centres are also advised to consult the generic document Guidance on conditions of assessment for clarification and exemplification of acceptable conduct during coursework assessments.

Appendix: general commentary on grade boundaries

SQA's main aim when setting grade boundaries is to be fair to candidates across all subjects and levels and maintain comparable standards across the years, even as arrangements evolve and change.

For most National Courses, SQA aims to set examinations and other external assessments and create marking instructions that allow:

- a competent candidate to score a minimum of 50% of the available marks (the notional grade C boundary)
- a well-prepared, very competent candidate to score at least 70% of the available marks (the notional grade A boundary)

It is very challenging to get the standard on target every year, in every subject, at every level. Therefore, SQA holds a grade boundary meeting for each course to bring together all the information available (statistical and qualitative) and to make final decisions on grade boundaries based on this information. Members of SQA's Executive Management Team normally chair these meetings.

Principal assessors utilise their subject expertise to evaluate the performance of the assessment and propose suitable grade boundaries based on the full range of evidence. SQA can adjust the grade boundaries as a result of the discussion at these meetings. This allows the pass rate to be unaffected in circumstances where there is evidence that the question paper or other assessment has been more, or less, difficult than usual.

- The grade boundaries can be adjusted downwards if there is evidence that the question paper or other assessment has been more difficult than usual.
- The grade boundaries can be adjusted upwards if there is evidence that the question paper or other assessment has been less difficult than usual.
- Where levels of difficulty are comparable to previous years, similar grade boundaries are maintained.

Every year, we evaluate the performance of our assessments in a fair way, while ensuring standards are maintained so that our qualifications remain credible. To do this, we measure evidence of candidates' knowledge and skills against the national standard.

During the pandemic, we modified National Qualifications course assessments, for example we removed elements of coursework. We kept these modifications in place until the 2022–23 session. The education community agreed that retaining the modifications for longer than this could have a detrimental impact on learning and progression to the next stage of education, employment or training. After discussions with candidates, teachers, lecturers, parents, carers and others, we returned to full course assessment for the 2023–24 session.

SQA's approach to awarding was announced in March 2024 and explained that any impact on candidates completing coursework for the first time, as part of their SQA assessments, would be considered in our grading decisions and incorporated into our well-established grading processes. This provides fairness and safeguards for candidates and helps to provide assurances across the wider education community as we return to established awarding.

Our approach to awarding is broadly aligned to other nations of the UK that have returned to normal grading arrangements.

For full details of the approach, please refer to the National Qualifications 2024 Awarding — Methodology Report.