Course report 2024

Higher Design and Manufacture

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: 2,035

Number of resulted entries in 2024: 2,004

Statistical information: performance of candidates

Distribution of course awards including minimum mark to achieve each grade

A	Number of candidates	219	Percentage	10.9	Cumulative percentage	10.9	Minimum mark required	117
B	Number of candidates	347	Percentage	17.3	Cumulative percentage	28.2	Minimum mark required	99
C	Number of candidates	469	Percentage	23.4	Cumulative percentage	51.6	Minimum mark required	82
D	Number of candidates	515	Percentage	25.7	Cumulative percentage	77.3	Minimum mark required	64
No award	Number of candidates	454	Percentage	22.7	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 paper

The question paper performed as expected. Feedback from the marking team suggested that it discriminated well and was fair in terms of course coverage and level of demand. In some questions, most candidates did not demonstrate the knowledge and understanding required at Higher.

Assignment

Overall, the assignment performed in line with expectations. All tasks generated a wide range of responses and marks.

'Carrying out research' and 'Demonstrating practical modelling skills' were re-introduced to the assignment this session, and the total assignment marks increased from 77 to 90. The tasks for the assignment were set and assessed by SQA, with candidates selecting one task from a choice of three.

The re-introduction of 'Carrying out research' was generally successful. It was evident that most centres had used the SQA exemplar material during the learning and teaching of the course, and candidates completed this section in the assignment to an appropriate standard. The re-introduction of 'Demonstrating practical modelling skills' allowed many candidates to attract marks.

Section 2: comments on candidate performance

Areas that candidates performed well in

Question paper

Overall, the performance in the question paper improved from the previous year. Candidates generally performed well in the following questions.

Question 1(a)

Answered well by many candidates. Credit was given for justifying the material selected relevant to the use of the part.

Question 1(b)

Answered well by many candidates. Candidates identified three different processes suitable for parts, with some explaining their suitability.

Question 1(c)

Answered well by many candidates. Candidates indicated features the products had that enable them to carry out their functions.

Question 1(d)

Answered reasonably well by many candidates. Some candidates explained the benefits of CAD in the manufacture instead of the design of the sun loungers, which did not attract marks.

Question 2(b)

Answered well by many candidates. Candidates identified a suitable material, and many attracted 1 or 2 marks for explaining its suitability.

Question 2(c)

Answered well by many candidates. From the responses, candidates understood methods that could be used to reduce the negative environmental impact of products.

Question 5(c)

Answered well by many candidates, who accessed 1 or 2 marks by explaining different factors that cause products to decline.

Question 5(d)

Answered well by many candidates, who accurately identified methods of protecting intellectual property. Many candidates got full marks for this question.

Assignment

Carrying out research

Many candidates demonstrated the ability to use a range of research techniques, gathered sizes of the required products, selected relevant anthropometric data and asked effective questions to inform the specification. Most candidates were awarded marks in the middle or upper band for this section.

Producing a specification

Most candidates demonstrated the ability to write a detailed specification, including clear details drawn from the research and briefs. Specifics included dimensions of products to be held, anthropometric sizes, location, functional aspects, cost and aesthetic requirements. Most candidates were awarded marks in the middle or upper band for this section.

Generating initial ideas

Most candidates used the theme successfully to generate a range of creative ideas that addressed the brief. Most candidates were awarded marks in the upper bands for this section.

Applying graphic techniques

Many candidates used a range of graphics to communicate effectively throughout their assignment. Candidates who scored in the upper band used a wide range of graphics to communicate various details such as scale drawings, exploded views, hidden detail, sections, dimensioned sketches/drawings, and/or component part manufacturing or mould details. Most candidates benefited from the dimensioned drawings in their 'planning for commercial manufacture' pro forma. Most candidates accessed at least half of the marks available in this section.

Producing a plan for commercial manufacture

Most candidates completed the parts table with a range of materials and processes. Many candidates provided some overall sizes of the proposal and further detail and sizes of the component parts. Many candidates communicated some detail about the product's assembly through either text or graphics. Candidates who showed good refinement of the assembly and manufacturing detail created the best opportunity to communicate detail of component parts. Most candidates achieved marks in the middle or upper band for this section.

Areas that candidates found demanding

Question paper

Question 1(d)

A very mixed response by candidates, with many candidates achieving 0 or 1 mark. To be awarded marks for this question, candidates should relate anthropometrics to a specific part of the body, and then how that interacts with the product. For example, the length of the arm rest must fit the length of the user's arm. The use of incorrect percentile ranges was not taken into account when awarding marks.

Some candidates used labelling to categorise their answer in terms of anthropometrics or physiology. However, at times, responses were under the incorrect label, for example, 'Anthropometrics — the force required to fold the chair must not cause additional strain (physiology)'. In this instance, the candidate would not have been awarded a mark.

Question 3(a)

Answered poorly by many candidates. In many cases, candidates did not outline a range of key stages for research techniques. Responses given by candidates suggested they struggled to articulate the practical task of carrying out research, which was re-introduced into the assignment this year.

Question 4(a)

Answered poorly by many candidates. Many responses were generic in nature and did not demonstrate a deeper understanding of types of graphic techniques, stages of the design process and information gained, which is required at Higher.

Question 6(a)

Answered poorly by many candidates. In many cases, candidates struggled to show a deep knowledge and understanding of material identification. Tests were often identified with little to no explanation given, for example, 'a flame test could be used to test the material.' This statement would not be enough to gain a mark; the candidate should describe the information gained from the test that identifies the material, for example, 'a flame test could be used to identify the material, as a different plastic will give off a different smell.'

Candidates should specify the materials in their description — for example, wood, metal or plastics. Many responses suggested that no practical material identification tasks had been carried out during learning and teaching.

Question 6(b)

Answered poorly by many candidates. Candidates failed to demonstrate an understanding of features that are created during manufacture, such as bosses or location pins. Many candidates referred to aids such as templates and jigs, which are not created during manufacture.

Question 7

Answered poorly by many candidates. Many either demonstrated a limited knowledge of a range of production and planning systems or gave a response that was too thin. This shows a lack of deeper knowledge and understanding of this area of the course, which is required at Higher.

Assignment

Exploring ideas

Although there was an improvement in candidates' exploration of ideas, some still lacked the depth and range of aspects and alternatives required to access the upper bands at Higher. A

few candidates developed more than one idea or used SCAMPER. These approaches typically limited the response of stronger candidates as they were often repetitive, and demonstrated limited problem solving and/or limited use of knowledge to drive improvements.

Candidates who performed well in this section typically used their brief and specification to identify a range of aspects to explore, and were more likely to consider the suitability and/or usability of their options to progress the design towards a suitable solution.

Refining ideas

Many candidates did not achieve beyond half of the marks available in this section as the refinement lacked range and level of detail. Some candidates' designs or components were not detailed enough in that they lacked the basic details such as holes or bosses for screws, wall thicknesses, component sizes or consideration of the user. Some candidates used models to help refine their idea.

Application of knowledge of materials and assembly processes

Many candidates did not achieve beyond half of the marks available in this section, due to limited application of knowledge before completing the 'planning for commercial manufacture' pro forma. Any additional or new information relating to 'Knowledge of materials and assembly processes' that is recorded solely on the 'planning for commercial manufacture' pro forma cannot attract marks. A few candidates did not show any application of knowledge of processes from the Higher course, but simply archived properties of materials that were irrelevant to their design or had little exploration. This limited their opportunities to make decisions.

Candidates who performed well in this section typically had a detailed proposal. They applied knowledge to explore and refine how each part could be manufactured, the materials they could be made from, how the parts could assemble, and showed evidence of manufacturing detail on the parts.

Application of design knowledge

Most candidates demonstrated an understanding of the functional and aesthetic aspects of the brief, though some candidates did not apply the range or depth of knowledge required to access beyond half of the marks available in this section.

Candidates did not make full use of the information from their brief, research and specification. Some candidates did not consider the user or their interaction with the product, or the sizes of the products to be stored. Some candidates attempted costings or part costings using the data booklet, or worked out complex sizes, which attracted marks in this section. A few candidates used modelling effectively to inform their design knowledge.

Applying modelling techniques

Many candidates had some evidence of modelling to either generate ideas, test or refine aspects of their proposal, however, many candidates did not access the marks available in the upper bands. Some candidates did not annotate their models to explain what has been

learned and/or tested from the models, or the pictures of models were too poor to communicate.

Some candidates put evidence of using models only on their ‘practical modelling skills’ pro forma. Marks could not be awarded for applying modelling techniques when out of context as the information gained or purpose of the model was not clear.

Candidates who use CAD models typically achieved some marks for communicating or refining sizes. Some candidates had no evidence of any modelling.

Demonstrating practical modelling skills

Some candidates performed well in this section using both simple modelling and resistant materials. Some candidates either did not have a pro forma in their assignment submission, had poor quality pictures that did not communicate detail and accuracy, did not put the most appropriate models on the pro forma, or submitted no evidence of any of practical modelling skills, and were unable to access the full range of marks available in this section.

Section 3: preparing candidates for future assessment

Question paper

Centres are advised to use Understanding Standards materials (for example, question paper commentaries, the question paper webinar, past question papers and marking instructions), which are available on SQA's Understanding Standards website, when preparing candidates for the examination.

Preparation for the question paper should also include training in examination techniques and producing acceptable responses to questions.

Many candidates are not describing or explaining their answers in sufficient detail for a question paper at Higher level. Enabling candidates to learn through practical activities may enhance their knowledge for these types of questions.

Centres should encourage candidates to discuss and debate to enable them to acquire a technical vocabulary that will help them produce acceptable answers in the question paper.

In addition, candidates should consider the mark allocation for individual questions when producing a response. A 4-mark question generally means that candidates must either provide four different correct statements or give an extended response to achieve full marks.

The course specification contains a section called 'Skills, knowledge and understanding' for the course assessment. This section lists all the available areas of sampling for the question paper. We advise teachers and lecturers to familiarise themselves with this content to prepare candidates to respond to these areas of questioning.

Assignment

Assignments must be presented on a maximum of 12 A3 sheets (or equivalent), which includes the four pro formas: 'research', 'research and specification', 'planning for commercial manufacture', and 'practical modelling skills'. If candidates are typing their responses or scaling writing from a digital device, they should be mindful that the size of the text should be easy for the marker to read.

Selecting a brief

Centres should guide candidates to select the best brief that will allow them to be creative and produce the evidence required. Centres should discuss the pros and cons of each task and ensure that candidates understand the breadth and depth of skills they need to demonstrate, and how they might do this, before making a final decision on the brief they wish to take forward for their assignment. Centres could consider the following points to discuss with candidates:

- What research will you carry out? Will that information help you make decisions when developing a unique solution?
- How could your ideas differ from existing solutions? Can you be creative with this task?

- What opportunities could you find for modelling?
- What kind of things will you need to sketch for this brief? Does this suit your graphic ability?
- How can you incorporate knowledge of materials and processes from the higher course?
- What are the sub-problems for this brief that could be explored and refined?

Planning for manufacture

Centres should ensure that they provide all candidates with the 'planning for commercial manufacture' pro forma. The plan must fit on this page and include materials and processes from the higher course and details of the overall assembly and individual components of their design.

Overly simplistic parts do not allow for an appropriate level of detail at Higher. Centres can prepare candidates by providing opportunities to look at the manufacturing and assembly features of component parts to help candidates improve the level of detail in their own parts. Candidates should communicate detail through graphics or annotations. Centres should remind candidates that no material and manufacture knowledge is awarded marks if presented only on the 'planning for commercial manufacture' pro forma page. All knowledge of design and materials and manufacturing processes must be recorded in the main body of the assignment to access marks available in those sections.

Carrying out research into a given brief

Centres can prepare candidates using Understanding Standards exemplification materials, and the research pages SQA produced from sessions 2022–23 and 2023–24 as a guideline before they begin their assignment.

Candidates should demonstrate use of techniques and research a range of issues. This should include sizes of items to be stored or any restrictions, anthropometric data, location or site details, and functional, aesthetic and performance requirements. Any images should have conclusions drawn from them, and be provided by or discussed with the client to be valid and access marks in this section. The information gathered from questionnaires and interviews should be meaningful and useful to make decisions about the proposal. When gathering anthropometric data, candidates should select specific sizes and provide reasons for the selection. Candidates should avoid product comparisons and existing products as these often do not allow them to access marks in this section.

Producing a specification

Centres can prepare candidates by reminding them that specifications should be written as 'it must' statements. They should also advise candidates to include the actual specifics, such as sizes or colours, in their written specification point.

Generating initial ideas

Candidates who accessed the full range of marks showed significant differences in aspects of their ideas, such as how it functioned, how it looked and how parts were arranged. Ideas had sufficient detail in the graphics, models or annotations to explain how they addressed the brief; for example, showing where items were held.

Candidates should select idea generation techniques appropriate to their strengths and the brief. Using good theme-related images or models can help candidates generate creative and diverse ideas.

Exploring ideas

There are resources on the Understanding Standards website to support centres and candidates in this section. These include candidate exemplification and commentaries of highly effective exploration, and skill builders to recognise exploration pathways and generate meaningful exploration.

Effective exploration increases the opportunity to access marks for knowledge, graphics and modelling. Centres should prepare candidates during the learning and teaching of the course to use the points in their brief and specification as aspects to fully explore their proposal.

Exploration is likely to include options for different functional requirements, interaction of the user and ergonomics, incorporating the theme, how to use the standard component, size or cost restrictions, and materials, manufacturing or assembly. Using models is a good way for some candidates to explore quick changes to an idea.

Refining ideas

Effective refinement uses the information gained through modelling and the details in the specification to make decisions such as sizes of parts, the products to be stored and reference to appropriate anthropometric sizes. Centres should remind candidates that use of the standard component provides an opportunity to inform decisions on how components could be designed to attach to them. Candidates should have knowledge from disassembling products during the course to communicate part detail, and select appropriate processes and methods of assembly.

Final sizes, materials and manufacturing decisions must be recorded on the ‘planning for commercial’ manufacture pro forma, as any refinement on this pro forma cannot access marks in this section.

Application of design knowledge

Centres should provide opportunities for candidates to practise effective annotation during class tasks. There are skill builder activities and resources available on the Understanding Standards website to help candidates with this skill. A few candidates submitted text-based assignments in which most of the text was unnecessary or repetitive.

Candidates who were awarded marks in the upper band created opportunities to apply design knowledge by exploring a range of aspects from the specification. They demonstrated a sound understanding of how different aspects of the product functioned to be fit for purpose and how the user would interact with it; made use of size restraints; and considered use of the standard components and how to meet the aesthetic requirements. Calculating simple costs for some or all components, calculating sizes, and recording findings of using models to test ideas will also attract marks in this section.

Application of knowledge of materials and assembly processes

Candidates should have an opportunity to disassemble and explore components and their features during the learning and teaching of the course so they can include an appropriate level of part detail in their own design work. Listing and labelling only accesses marks in the bottom band. Candidates who score well typically apply knowledge during their exploration and refinement to compare or select appropriate materials, processes and assembly methods for their components. Candidates in the upper bands also consider the features of components such as incorporating features of die cast, or injection moulded parts or their moulds.

Using graphics

Centres could prepare candidates during the course by setting tasks to use a range of different graphics. This may include graphics such as quick sketches, 2D or 3D exploded details, hidden detail, scale drawings, detailed views, dimensioned sketches or drawings, 2D and recognised pictorial sketches. This could be done as a study of simple component parts, their manufacturing features and assembly details.

Applying modelling techniques

Centres should prepare candidates before the assignment by providing an opportunity to 'use' models for a range of different purposes, and ensuring candidates can record what they have learned from the model.

When using models to generate ideas, candidates can be creative adding detail to simple abstract 3D forms, which can help access marks available in this section. Candidates can make and experiment with how they could use the standard component, or use models when they have difficulty sketching an idea. It is important that candidates accurately record what they are learning from each model and design change. Modelling for this section can be rough in nature. CAD modelling usually attracts some marks for communicating or working out sizes but can limit effective exploration.

Candidates who used models effectively can access marks in generating ideas, knowledge, exploration and refinement sections by recording and acting on the information they have gained through the use of their models. Pictures of the models must be placed in the body of the assignment as and when they are produced, with relevant annotations. Marks will not be awarded for this section for any models only on the 'practical modelling skills' pro forma.

Demonstrating practical modelling skills

Centres can prepare candidates by using SQA Understanding Standards materials and ensure that all candidates are provided with the 'practical modelling skills' pro forma. CAD or CAM models will not attract any marks in this section.

It is likely that evidence will be generated naturally as the candidate explores and refines their proposal, and candidates should include pictures of any models used during their assignment that demonstrate detail or skill. Candidates should consider making one of the standard components as these can help them attract marks in this section. Alternatively, candidates may choose to 'mock up' part of their solution.

Candidates can make models from quick modelling materials including card and foam, or workshop materials such as MDF or acrylic. The skill required to work with each material and form is considered.

Pictures on the pro forma must be clear and of an appropriate size to ensure the detail of the models can be seen. A steel rule can be used to communicate scale or proportion. There is no need to annotate this page.

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.