



## Course report 2019

Subject	Design and Manufacture
Level	Higher

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. It would be helpful to read this report in conjunction with the published assessment documents and marking instructions.

The statistics used in this report have been compiled before the completion of any post-results services.

# **Section 1: comments on the assessment**

## **Summary of the course assessment**

### **Question paper**

The question paper was revised for 2019, with content and marks added.

The question paper performed in line with expectations. Feedback from the marking team suggested that it discriminated well and was fair in terms of course coverage and overall level of demand.

### **Assignment**

The assignment was revised for 2019, with content and marks added. All tasks generated a wide range of responses and marks. The assignment was slightly more demanding than anticipated and, as a result, the grade boundary was lowered.

## Section 2: comments on candidate performance

### Areas that candidates performed well in

#### Question paper

**Question 1(a)** was answered well by most candidates. Candidates should avoid repetition and explain six different properties or characteristics of the materials given. The answers should be appropriate to the products. There was no requirement for candidates to cover materials from both products in their answer.

**Question 1(b)** was answered well by most candidates. Candidates received credit if they gave a correct explanation to an incorrect process. There was no requirement for candidates to cover both products in their answer.

**Question 1(c)** was answered well by most candidates.

**Question 1(d)** was answered reasonably well by most candidates, although some candidates explained the benefits of standard components for the user instead of the manufacturer.

**Question 1(e)** was answered reasonably well by most candidates. To achieve marks for this question, candidates should make sure they relate anthropometrics to a specific part of the body, and then how that interacts with the product. The use of incorrect percentile ranges was ignored. Some candidates used labelling to categorise their answer in terms of anthropometrics and/or physiology.

**Question 2(b)** was answered well by most candidates.

**Question 2(c)** was answered well by most candidates.

**Question 3(a)** was answered well by most candidates although some candidates outlined the benefits of using CAD in general, not during the design process.

**Question 3(b)** was answered very well by most candidates. Candidates clearly understood the benefits of a strong brand image.

**Question 3(c)** was answered well by most candidates.

**Question 4(b)** was answered reasonably well by most candidates. Candidates were given credit where they gave a correct description to an incorrect modelling type.

**Question 5(a)(i)** was answered reasonably well by most candidates. In most cases candidates did not describe the purpose and then give an example. They gave a short response that would be enough for 1 mark with either a description of the purpose, or an example.

**Question 5(c)** was answered very well by most candidates. Candidates clearly understood how manufacturers could reduce the negative environmental impact of their products.

**Question 6(c)** was answered well by most candidates.

## **Assignment**

### **Producing a specification**

Most candidates demonstrated the ability to draw up a reasonably detailed specification using information drawn from their research and the brief.

### **Generating initial ideas**

A number of candidates produced good evidence for generating initial ideas. The majority of candidates had appropriate detail for this stage and demonstrated diversity in their range of ideas.

### **Refining ideas**

Most candidates had good evidence for refinement. Candidates generally made refinements relating to function, materials, and assembly methods. Some candidates used their specification effectively to refine other important aspects of the proposal.

### **Applying graphic techniques**

Candidates generally used graphics effectively to communicate throughout the assignment. The majority of candidates used a range of graphics appropriately and communicated details of the component parts and their assembly.

### **Producing a plan for commercial manufacture**

Candidates generally performed well, completing the plan for commercial manufacture pro-forma with appropriate information and clarity. Almost all candidates attempted the parts table and provided some detail of the components and their assembly.

## **Areas that candidates found demanding**

### **Question paper**

**Question 2(a)** was answered poorly by many candidates. Candidates struggled to give relevant explanations for why vacuum forming was used for the food packaging, with responses relating to the material used rather than the process itself.

**Question 3(d)** was answered poorly by many candidates. Candidates simply stated what they could see in the graph rather than showing a deeper knowledge and understanding of the product lifecycle.

**Question 4(a)** was answered poorly by many candidates. Candidates struggled to meaningfully discuss the aesthetics of the razors, showing a lack of knowledge and understanding of different aesthetic aspects.

**Question 5(a)(ii)** was answered poorly by most candidates. Most candidates gave a short response that would, in some cases, be enough for 1 mark, with either a description of the purpose or an example.

**Question 5(b)** was answered poorly by many candidates. Many candidates gave a generic answer and therefore did not attract the full range of marks

**Question 6(a)** was answered poorly by many candidates. Many candidates gave a generic answer and therefore did not attract the full range of marks.

**Question 6(b)** was answered poorly by many candidates. In most cases, candidates were able to show a good understanding for the use of ribs and/or webs. However, they showed a lack of knowledge and understanding of the purpose of location pins and/or bosses.

**Question 7** was designed to assess candidates' understanding of how a variety of graphics can be used effectively at different stages of the design process.

There was a wide range of responses to this question. Some candidates answered well, using examples to illustrate their points. Some candidates gave generic answers that did not demonstrate clear understanding. Some candidates showed a lack of understanding of the variety of graphics that could be used in the design process by describing preliminary, production and promotional graphics.

Many candidates gave a brief description of graphics that could be used during the design process with elements of repetition over each description.

Some candidates struggled to stay focused on graphics, making generic points that did not demonstrate a good understanding.

## **Assignment**

### **Carrying out research into a given brief**

Although the majority of candidates made a good effort in gathering information and using different techniques, many struggled to access marks in the top band. This was because they gathered information that was not useful for drawing up the specification.

### **Exploring ideas**

Although most candidates had evidence for exploring ideas, many failed to access marks in the upper bands. Candidates who made limited use of their specification did not explore alternatives for the many different aspects of the task required to evolve the proposal.

### **Application of design knowledge**

Most candidates demonstrated some knowledge, generally relating to function or aesthetics. Candidates who made limited use of the information in the brief and specification, or who had little exploration, limited their opportunity to apply knowledge of a range of design issues.

### **Application of knowledge of materials and assembly processes**

Application of knowledge was often limited to the plan for commercial manufacture pro-forma. Few candidates used knowledge to evolve the proposal. Many candidates' knowledge of processes was limited to simply identifying a process. Few candidates demonstrated knowledge of the features or limitations of the processes, or properties of materials relative to their task.

### **Applying modelling techniques**

Although some candidates did very well in this area, many candidates had limited evidence of using models. Few candidates used models to generate ideas. Many candidates produced CAD drawings but had no evidence of any modelling. Some candidates only picked up marks by exploring the use of the standard component.

## **Section 3: preparing candidates for future assessment**

### **Question paper**

Centres are advised to use the materials on SQA's website when preparing candidates for the examination (for example specimen question papers, past question papers and marking instructions).

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

Many candidates are not describing or explaining their answers in sufficient detail for a question paper at Higher level. Centres should encourage candidates to discuss and debate so that they acquire a technical vocabulary that enables them to produce acceptable responses to questions in the question paper.

Candidates should consider the mark allocation for individual questions when producing a response.

The section on course coverage in the course specification provides details of the knowledge and understanding which can be sampled in the question paper. Teachers and lecturers are advised to familiarise themselves with the mandatory content to prepare candidates to respond to these areas of questioning.

### **Assignment**

Centres should note the following when preparing candidates for the assignment.

#### **Carrying out research into a given brief**

Although the majority of candidates had conducted primary and secondary research, not all research attracted marks. Candidates often gathered unnecessary information that would have no impact on their specification or design decisions. Some candidates included appropriate information, such as anthropometric data or the sizes of the items to be stored. Candidates who selected specific sizes from the range of data they collated demonstrated more skill.

#### **Producing a specification**

When completing the specification, candidates must ensure they include the key starting points given in the brief. Some candidates amended these points based on the information gathered in their research. It is acceptable for candidates to do this. Candidates who attracted full marks in this section transferred the specific details and sizes from their research into their specification.

#### **Generating initial ideas**

Using a range of idea-generation techniques may help candidates generate a wider range of diverse ideas. It is not necessary to state or display the methods used. Producing few ideas limits candidates' ability to demonstrate a high level of skill in this area. Some candidates who struggled with graphics used models to generate more creative ideas. Candidates who

were allocated marks in the top band showed diversity in different aspects of their ideas and considered more than aesthetics.

### **Exploring ideas**

Centres should encourage candidates to use their specification to explore alternative aspects of their proposal, particularly the restraints such as sizes, aesthetics and functional requirements. They should also encourage candidates to explore how the standard component could be used in the proposal. Candidates are not penalised if they do not use the standard component; it is included in the task to provide an additional thread for exploration.

### **Refining ideas**

Candidates should record any refinement taking place. Encouraging the use of modelling to make more meaningful decisions may help candidates do this. Candidates should record all decisions for the design and manufacture of their solution (including dimensioned sketches, models or drawings) before completing the planning pro-forma. Centres should encourage candidates to use the standard component as it provides them with an opportunity to use the specific sizes to inform decisions on how their components will be designed and assembled.

### **Application of design knowledge**

Candidates who performed well in this section made good use of their specification when exploring and refining ideas. This ensured they demonstrated knowledge of a range of issues relevant to the evolution of the proposal. Candidates should make use of restraints such as sizes, aesthetics, functional requirements and the standard component. Many candidates calculated simple costs for some or all of the components; this allowed them more opportunity to explore and refine. It is not necessary to calculate volume of material. Considering the use of the standard component or its limitations also provides further opportunity to apply design knowledge.

### **Application of knowledge of materials and assembly processes**

Centres should provide candidates with an opportunity to explore the suitability and limitations of different manufacturing and assembly methods for given products and/or components, or during design tasks. Candidates must demonstrate an understanding of the features or limitations of the processes and/or appropriate material properties for the components they are designing.

### **Applying modelling techniques**

Candidates should be familiar with using models to generate ideas, explore, test and refine aspects of a design. Centres should ensure candidates have the opportunity to use modelling for different purposes, so they develop the confidence and ability to decide when a model is required.

Centres should encourage candidates to use models when they have difficulty sketching an idea, or where they can learn to make more meaningful decisions by using a physical or CAD model. Models should communicate something that is not in the sketches. Candidates must use annotation to explain what information they gained from the model if they used it to explore, test or refine. The standard component provides a clear opportunity to use modelling. Candidates can explore how it might fit or work, and/or any changes they might



make to improve or incorporate it. It is likely that some of the models produced will also provide evidence for practical modelling skills.

### **Demonstrating practical modelling skills**

Centres are reminded that all modelling in the assignment must be candidates' individual work. All modelling across the assignment can attract marks for practical modelling skills and so centres must not help candidates with modelling, or produce models for an individual candidate or class.

Although printed components may attract marks in using models, they are not appropriate evidence for attracting marks for practical modelling skills.

Practical modelling skills do not require use of resistant materials and should not be overly time-consuming. The models used to generate, explore, refine or communicate could generate evidence for this section.

Some candidates demonstrated a high level of skill in accuracy and detail in a series of card models. Marks are awarded for models produced to scale, where parts are evenly measured and spaced, and/or accurate in size or assembly.

### **Producing a plan for commercial manufacture**

The plan should communicate what the final solution or assembly will look like, as well as the key component parts. Candidates should provide sufficient detail, for example fully dimensioning some of the component parts and providing overall sizes. Candidates should use graphics or annotations to communicate the assembly methods and processes to be used.

## Grade boundary and statistical information:

### Statistical information: update on courses

Number of resulted entries in 2018	2820
Number of resulted entries in 2019	2248

### Statistical information: performance of candidates

#### Distribution of course awards including grade boundaries

Distribution of course awards	Percentage	Cumulative %	Number of candidates	Lowest mark
<b>Maximum mark</b>				
<b>A</b>	11.8%	11.8%	265	117
<b>B</b>	17.4%	29.2%	391	98
<b>C</b>	25.0%	54.2%	563	79
<b>D</b>	24.2%	78.4%	543	60
<b>No award</b>	21.6%	-	486	-

## General commentary on grade boundaries

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

SQA aims to set examinations and create marking instructions that allow:

- ◆ a competent candidate to score a minimum of 50% of the available marks (the notional C boundary)
- ◆ a well-prepared, very competent candidate to score at least 70% of the available marks (the notional 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 every year for each subject at each level to bring together all the information available (statistical and judgemental). The principal assessor and SQA qualifications manager meet with the relevant SQA head of service and statistician to discuss the evidence and make decisions. Members of the SQA management team chair these meetings. SQA can adjust the grade boundaries as a result of the meetings. This allows the pass rate to be unaffected in circumstances where there is evidence that the question paper has been more, or less, challenging than usual.

- ◆ The grade boundaries can be adjusted downwards if there is evidence that the question paper is more challenging than usual.
- ◆ The grade boundaries can be adjusted upwards if there is evidence that the exam is less challenging than usual.
- ◆ Where standards are comparable to previous years, similar grade boundaries are maintained.

Grade boundaries from question papers in the same subject at the same level tend to be marginally different year to year. This is because the particular questions, and the mix of questions, are different. This is also the case for question papers set by centres. If SQA alters a boundary, this does not mean that centres should necessarily alter their boundary in the question papers that they set themselves.