Course report 2022

Subject	Graphic Communication
Level	Advanced 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 appeals.

Grade boundary and statistical information

Statistical information: update on courses

Number of resulted entries in 2022	465

Statistical information: performance of candidates

Distribution of course awards including grade boundaries

A	Percentage	15.0	Cumulative percentage	15.0	Number of candidates	70	Minimum mark required	84
B	Percentage	20.0	Cumulative percentage	35.0	Number of candidates	95	Minimum mark required	70
C	Percentage	25.5	Cumulative percentage	60.5	Number of candidates	115	Minimum mark required	56
D	Percentage	19.5	Cumulative percentage	80.0	Number of candidates	95	Minimum mark required	42
No award	Percentage	20.0	Cumulative percentage	N/A	Number of candidates	95	Minimum mark required	N/A

You can read the general commentary on grade boundaries in appendix 1 of this report.

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 more statistical reports on the statistics page of SQA’s website.

Section 1: comments on the assessment

Question paper

As part of the modifications to assessment for session 2021–22, 10 marks were removed from the question paper, and it did not assess 'graphic communication as it impacts on our environment and society'. We published revision support for learners, which outlined content that would be assessed in the question paper.

There was some improvement in candidate performance in questions related to 3D modelling and elements and principles, but there were four questions that candidates found more challenging than expected. As a result, the grade boundaries were adjusted.

Question 3(c)

Many candidates accessed 4 out of 8 marks related to knowledge of print media (image resolution, file types, colour space and suitability of graphics for CADCAM production). Few candidates accessed the remaining marks, which required relating this knowledge to the context of the question (how the 'artwork guidelines' assisted the print company).

Question 4(b)

This question about HDRI techniques was poorly attempted by most candidates.

Question 6(a) and (b)

This was designed to be a 'C' discriminator question; however, a significant number of candidates misinterpreted the question, answering how the interactive screen was designed to be easy to navigate rather than why it was designed to be easy to navigate.

Part (b) of question 6 referred to the labelled graphic of the company logo. A significant number of candidates answered the question based on the entire interactive screen rather than the company logo specifically.

Question 7 (b)(i) and (b)(ii)

The questions, which related to an 'irregular fillet' and 'sketch constraints', had not featured in previous question papers, which may account for the poorer responses. Candidates often failed to include key dimensions or annotation (for example, 'starting point of irregular fillet' or indicating the 'point of tangency' applied to the relevant arcs or lines). Candidates who included clear, annotated sketches often gained higher marks. For questions that include the phrase 'sketches may be used to support your answer', candidates should include sketches.

Project

As part of the modifications to assessment for session 2021–22, four areas were removed from the project, reducing the total marks from 90 to 60.

The majority of candidates combined their technical graphics (TG) and commercial and visual media graphics (CVMG) work, using TG models to support the development of CVMG graphics. Where candidates separated their TG and CVMG work, the work produced was of

the same standard and had no bearing on them achieving higher or lower marks. The project allows candidates to take an approach that suits them.

Candidates found it difficult to access the full range of marks in CVMG solutions. The grade boundaries were adjusted to account for this. We have revised the project marking instructions for session 2022–23 to make the criteria within certain components of the project more specific.

TG and CVMG preliminary planning

It was expected that candidates would perform well in both TG and CVMG preliminary work; however, some candidates found this challenging. Some candidates did not attempt TG preliminary planning. Retrospective approaches to preliminary planning were evident in some candidates' work, and this resulted in 0 marks being awarded.

TG graphic solution

Candidates performed well in the TG graphic solution, with many achieving high marks. Candidates chose suitable approaches to 3D CAD modelling, with modelling being of a complex nature and the range of required techniques being accessed, in most cases. The nature of the models produced allowed for a good standard of both component and assembly drawing work. Candidates utilised simulation and illustration techniques to a very good standard, enabling them to achieve high marks for these aspects of TG solutions.

CVMG graphic solution

Many candidates found the CVMG graphic solution the most challenging aspect of the project. Many candidates were unable to gain marks in the top two bands for print-based and digital graphics. Many candidates did not include annotations to demonstrate their understanding of CVMG techniques and only produced a limited range of graphics that did not cover the requirements of the project.

Please refer to the published Understanding Standards materials as these exemplify the standard required.

Section 2: comments on candidate performance

Question paper

In addition to the questions considered in section 1, this section contains further information about parts where candidates generally performed well, and parts that candidates found more demanding.

Question 1(a)

Most candidates performed well, they had a solid understanding of how the design met the brief and they gave clear descriptions.

Question 1(b)

Many candidates did not know what 'calendaring' or 'duplexing' was.

Question 2

Most candidates attempted this question, but with varying success.

Question 2(a)

Some candidates started from the top and worked their way down in bite-size CAD steps (sketch, extrude, sketch, revolve, sketch, extrude), meaning marks were gathered across a collection of steps. Most candidates did not gain marks on the detailing of the horizontal profile path, with dimensions missing or processes not fully explained. The helix part was mainly done well, but many candidates failed to use the correct terms such as 'pitch' and 'taper'. Many candidates did not include the axis and distance to the profile sketch when modelling the helix.

Question 2(b)

Very few candidates used the term 'mesh' for the first step. As this is the first time a question specifically related to morphing (freeform modelling) featured in the question paper, a range of terms synonymous with mesh were accepted, but 'mesh' or 'applying a mesh' is the recognised term. Only a few candidates included the term 'symmetry lines', but the majority did get the terminology correct on the morphing itself, using terms like 'manipulation' and 'stretching'. Very few candidates used the term 'convert to solid model'. Many candidates included well-drawn sketches, but the descriptions and terminology let them down.

Question 3(a)

Most candidates achieved the mark for this question.

Question 3(b)

The explanations of the difference between 'ppi' and 'dpi' were very diverse. Only a few candidates were able to achieve full marks by demonstrating that they knew that one was digital and one was print.

Question 3(c)

There were no full-mark responses for this question. Many candidates managed to explain some important points in relation to the artwork guidelines, but a lot of responses were simply writing out details from the guidelines without explanation as to the importance of them. For example, several candidates wrote 'correct file types should be used' but there was no further expansion on the specific file types, and which ones are correct or better suited to the application.

Question 3(d)

Some candidates understood the screen-printing process and its advantages and disadvantages, with a number of candidates thinking it related to a physical printer and mentioning dpi as part of their answer.

Question 3(e)

Most candidates gave the same response for mpeg and 3gp.

Question 4(a)

Most candidates answered this question well. They recognised the techniques of bump mapping and texture mapping. However, the descriptions of texture mapping often failed to mention the scaling factor required to enhance the realism. Several candidates mentioned volumetrics, but their explanations were not accurate. Some candidates confused illustration techniques with lighting techniques, for example IBL.

Question 4(b)

Few candidates were awarded 2 marks for this question due to a general lack of understanding about HDRI.

Question 4(c)

As with part (a), the majority of candidates understood the correct terms, but the explanations were not always accurate.

Question 5(a)

Most candidates provided a strong response to this question. They explained how the test would be applied, what information it would provide, as well as suggesting different ways it could be used to improve the design of the bridge.

Question 5(b)

Most candidates understood the use of the topographical survey.

Question 5(c)

Most candidates provided good responses and demonstrated knowledge of motion tweening. However, some candidates needed to further explain its advantages and justify its use in the context of the question.

Question 6(a)
Please see section 1. Most candidates did not achieve full marks for this question.

Question 6(b)
Most candidates did not answer the question. Instead of describing the use of focal point, silhouette, and negative space on the logo, they commented on their uses in the larger interactive screen.

Question 6(c)
The response to radial balance was poor overall, with many candidates describing it as symmetrical and not referring to the 'radial' aspect of it. The question on texture had a solid response overall, with many candidates identifying the correct textured aspects, but missing the second mark for failing to describe the impact of it.

Question 6(d)
Although animation techniques (for example motion tweening) or transition terms (for example fade), or a combination of both, could have been used, a large majority of candidates were not able to describe their use within this context.

Question 7(a)
Many candidates pointed out errors that were not related to British Standards (BS). Candidates should be encouraged to examine whether line types, view labels, BS symbols and tolerances are correct to BS, and relevant rather than in-house variables such as the size of text and precise positioning of enlarged views.

Question 7(b)(i) and (ii)
In most cases, this was not a strong response. Many candidates described the process of 3D modelling the part and then using a fillet, showing that they had not read the question correctly. (The question clearly states '2D CAD sketch constraint'.) Irregular fillet was identified in part (b)(ii), but simply stating it was not enough and the full description of how it had been applied, with relevant start and finish points and related dimensions, was lacking.

Question 7(c)
This question about CFD and motion capture had a lot of interesting responses. The most common mistake candidates made was describing the testing of the aerodynamics of the kayak. Many candidates seemed to associate CFD with air tunnel testing and did not refer to hydrodynamics or fluid flow relevant to this context.

There was also confusion on the contextual application of the product, with candidates describing testing as only relevant to the sinking of the kayak and it generally filling with water. Motion capture application appeared to be better understood, but many candidates thought it only related to CGI or promotional type applications, and not to analysing design efficiency or identifying improvements.

The stronger responses related to 3D CAD modelling and identified the purpose of graphics and illustration techniques. The weaker responses related to some design elements and

principles, understanding of graphics techniques, and their application within certain contexts. Where candidates were required to provide advantages and disadvantages of file types, printing methods, and animation methods, responses were weaker.

Project

This section focuses on the areas of the project that candidates performed well in and the areas that candidates found demanding.

TG preliminary planning

Candidates we able to produce 2D and 3D sketches that provided good visual understanding of the project being undertaken. They selected and correctly used appropriate modelling techniques and provided some information that would enable the progression to production graphics. Overall, candidates demonstrated skill in reverse-engineering and/or designing products or items to support the development of TG work.

Overall, candidates found it difficult to provide sufficient technical detail to support understanding of the model, for example detailing complex details or features, not showing sectional views to support interpretation, limited assembly details, and limited annotation to highlight key modelling techniques or features of the design or model.

Candidates found it challenging to provide enough information to enable the progression to production drawings. Many candidates failed to include dimensions for the position of key features within their products, with many only providing overall sizes, the position of location holes or key assembly features, and the more complex features of their chosen items or products.

Some candidates found staying within a suitable number of pages challenging as they sketched each component on a separate piece of paper. This resulted in them having to scan and scale pages down to fit the overall page limit, which diminished the quality of their work and presented issues with interpretation of their graphics.

Many candidates presented evidence that was retrospective — copied from their production drawings within the TG solution. This has been addressed in all Understanding Standards materials and is not a valid approach to the assessment.

CVMG preliminary planning

Producing appropriate preliminary graphics for print-based and digital work was strong overall, as was annotating preliminary graphics to detail technical requirements, and justifying their use of elements and principles. Overall, candidates demonstrated creativity in producing a range of layouts for either print-based or digital graphics.

For candidates who chose a suite of graphics for print-based graphics, many did not produce layouts or designs for the required three items, resulting in a lack of creativity across their work. Some candidates only produced a layout or design for single or two-page layouts. Therefore, they did not meet the requirements for a suite of graphics or multiple page layouts.

For digital graphics, some candidates did not produce the minimum requirement to show multiple screens, or in the case of animations, at least 2 minutes of content.

Candidates found it challenging to demonstrate creativity across printed and digital graphics, with one area often being more detailed than the other.

TG solution

Most candidate models demonstrated a clear link to preliminary work, which was often evidenced visually.

A suitable number of component drawings were provided for all components, or only key components.

Overall, candidates provided most dimensions that would allow their products to be manufactured.

Assembly work largely included sections and exploded views, with some candidates providing enlarged views to detail key assembly features and demonstrate accurate assembly.

Candidates were able to produce a range of technical detail from the list provided in the project assessment task, and produced simulations that were mostly appropriate, with only some interpretation being required. FEA tests were consistently of a good standard and well presented.

Most candidates provided good-quality technical renders that demonstrated the use of the techniques listed in the project assessment task.

The scale chosen for component drawings was often too small, making approaches to page layout and the interpretation of components challenging. Many candidates did not include sectional views to support understanding and clarity. Many components were missing key dimensions that would be required for manufacture. This was often specific to key features, location holes, and complex detail.

Although candidates provided assembly drawings, their scale was often too small, meaning that accurate assembly could not be assessed. Cutting planes for step sections, in particular, were often placed poorly, resulting in sectional work that was not useful in supporting clarity of the assembly. Exploded views had overlapping components in a number of candidates' work.

Line weights for component and assembly drawings were often too heavy. This resulted in a lack of clarity and made interpretation challenging.

Some candidates created too many production drawings, resulting in them having to scale-down their work and present it on fewer pages. This limited clarity and made interpretation challenging.

Although standards and conventions were reasonably good, many candidates did not include centre lines, dimension symbols for radii or diameters, or view labels, and did not

complete title blocks. Many candidates had repeated dimensions, touching leader lines, poor hierarchy of dimensions, and produced dimensional work that cluttered drawings and made clarity challenging.

CVMG solutions

Producing appropriate graphics for print-based and digital work that demonstrated a good standard was strong across the board. Most candidates ensured that graphics were clear and included most of the required detail.

Developing preliminary graphics into final solutions was strong overall, as was identifying the use of elements and principles, and technical requirements of the graphic.

Candidates also demonstrated a sound ability to create brand continuity between print-based and digital graphics.

Producing CVMG work that demonstrated a very high standard and presenting print-based work in the correct pre-press formats as required by the chosen printing method, appeared to be challenging for candidates overall. Many candidates simply applied registration marks, crop marks, colour bars, and densitometer bars to graphics. Application of these was often incorrect and did not show a detailed understanding of CVMG techniques.

Some candidates produced solutions that contained placeholder text. This has been addressed in Understanding Standards materials and is not considered a final solution.

Some candidates produced too much work. They created a suite of graphics, a leaflet or magazine, an animation, and a website or application. This did not leave them enough time to ensure specific items were of the best quality.

Demonstrating a detailed understanding of the use of CVMG techniques as appropriate to their graphic items appeared to be challenging overall. Very few candidates carried out a detailed analysis of their work to demonstrate use or knowledge of the following:

Print-based graphics

- appropriate use of colour space
- choice of file types
- resolution considerations
- choice of print techniques and specific print requirements
- format requirements
- paper requirements

Digital graphics

- appropriate use of colour space
- choice of file types
- resolution considerations
- format and compatibility issues
- transitions
- overlays
- navigation
- functionality
- in the case of animations, time stamps
- justifying the use of elements and principles to describe how visual impact has been created

Section 3: preparing candidates for future assessment

Question paper

Further clarification on the meaning of the terms in the course specification is contained in the Understanding Standards webinar and supporting materials. The following information about the key terms from this year's question paper may be useful to prepare future candidates.

Silhouette

Looking across a range of definitions, the majority refer to silhouette as being a dark shape against a pale background and not necessarily black on white. For clarity, a letter or word will not normally be accepted as creating a silhouette; however, it was accepted this year because of the wide range of interpretations of the word 'silhouette'.

Also, a silhouette must be a representation of an identifiable object or living thing and not just a shape (for example a circle).

Negative space

Negative space is not another name for white space. Negative space is the deliberate use of the background colour within a graphic to add new information.

Negative space provides new content, while white space is the absence of content.

Paper weight

Paper weight is measured in grams per square metre (gsm) and determines the thickness of the paper. It is distinct from the terms 'bleed' and 'opacity' or 'transparency'. It is possible to have thicker paper that still bleeds ink and thicker paper that is transparent (such us higher quality tracing paper).

Topographical survey

This survey relates to natural landscape features including contours, slope aspect, and natural land features. In future years, if manufactured features or water courses require consideration by candidates, then this will be made clear in the question.

Wall thickness

Wall thickness (in the context of a question about a cylindrical shelled object) can be determined by subtracting the required inner radius from the outer radius, and not by subtracting the required inner diameter from the outer diameter.

Applied lighting

Candidates are required to learn about different types of applied lighting (for example area light) or reactive lighting (IBL), so 'applied lighting' is not an acceptable response as it is too generic.

In addition, candidates should revise the terms ‘calendaring’, ‘HDRI’, and ‘radial balance’, and be able to explain why each might be used. With respect to radial balance, candidates must refer to the features that are radially balanced in their response.

Candidates should show as much understanding of the context of the question as they can, especially for questions that require more extended responses.

Project

This section provides specific advice on how to better support candidates with the most challenging areas of the project. These areas are also addressed in Understanding Standards materials. Centres should make use of these.

TG preliminary planning

Candidates should annotate or label their work to show how they intend to use the required modelling techniques.

Candidates will attract more marks where they provide relevant technical detail to enhance the clarity and understanding of their work.

Although candidates normally miss some dimensions, they should ensure they include the critical sizes. It may be useful for candidates to complete skill-building tasks, where they apply dimensions to drawings to understand the expected standard at this level.

Candidates should aim to present their work on two pages to avoid having to scan and scale work, as taking this approach limits clarity and reduces quality.

Candidates must avoid retrospective planning. If candidates copy production drawings from their technical graphic solution, markers cannot assess the standard of planning and sketching.

CVMG preliminary planning

Candidates working on a suite of graphics should ensure they plan three graphics items. This can include logos, vinyl decals, and single-page layouts such as postcards, flyers, posters, pull-up displays, billboards, and bus liners.

Candidates working on multi-page graphics should ensure they have produced a multi-page document with a minimum of four pages, and at least one double-page spread.

For digital graphics, candidates must produce multiple screens. A minimum of four is recommended to ensure sufficient creativity and to demonstrate functional aspects of the graphics.

Animation candidates should plan for at least 2 minutes of content and show time stamps for key frames within the design to highlight this.

TG solutions

Candidates do not need to produce component drawings for every component and should focus only on key components that demonstrate their chosen modelling techniques. This reduces the need to use too many pages in presenting work.

Candidates should annotate or label their components to demonstrate what modelling techniques they have used within their model. They should ensure sections are included within their component drawings, especially where this adds clarity to internal detail.

Although candidates normally miss some dimensions, they should ensure they include the critical sizes.

In assembly work, cutting planes for sectional work must clearly demonstrate the assembly of the model. Where required, candidates may include more than one section, and candidates should also include enlarged views for intricate assembly detail to evidence the correct assembly of components.

Candidates should ensure that exploded views are correctly aligned and have no overlapping components.

Candidates should ensure scales and line weights impact on clarity when drawings are printed. Centres can advise candidates on suitable scales and line weights. This could be done before the project through skill-building lessons focusing on British Standards and conventions for clarity.

CVMG graphic solution

Candidates must present print-based solutions in a pre-press format and digital graphics in a format ready for digital publication. Candidates should ensure that final solutions are presented without placeholder text. Placeholder text indicates that graphics are still in the development phase and are not final solutions.

When it is not relevant to the chosen print-based graphic items, candidates should avoid applying:

- registration marks
- crop marks
- colour bars
- densitometer bars

Candidates should present all work in the correct the pre-press format as required by the chosen print technique. Candidates should use lesson notes (and further research where required) to support them with this.

Candidates should annotate their work to describe the technical requirements of their solutions. This should include information on the following as appropriate.

Print-based graphics

- appropriate use of colour space
- choice of file types
- resolution considerations
- choice of print techniques and specific print requirements
- format requirements
- paper requirements

Digital graphics

- appropriate use of colour space
- choice of file types
- resolution considerations
- format and compatibility issues
- transitions
- overlays
- navigation
- functionality
- in the case of animations, time stamps

Candidates should include annotations that justify how the use of elements and principles enhances the visual impact. Candidates can choose how many elements or principles they focus on, and this does not need to be excessive.

Annotation from CVMG preliminary should be carried over to final solution work to confirm final choices.

To avoid producing too many graphics with limited quality, candidates should ensure that they produce graphics for the specified criteria as listed under CVMG preliminary planning above, and not take on too much.

Appendix 1: 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.

Grade boundaries from question papers in the same subject at the same level tend to be marginally different year on year. This is because the specific questions, and the mix of questions, are different and this has an impact on candidate performance.

This year, a package of support measures including assessment modifications and revision support, was introduced to support candidates as they returned to formal national exams and other forms of external assessment. This was designed to address the ongoing disruption to learning and teaching that young people have experienced as a result of the COVID-19 pandemic. In addition, SQA adopted a more generous approach to grading for National 5, Higher and Advanced Higher courses than it would do in a normal exam year, to help ensure fairness for candidates while maintaining standards. This is in recognition of the fact that those preparing for and sitting exams have done so in very different circumstances from those who sat exams in 2019.

The key difference this year is that decisions about where the grade boundaries have been set have also been influenced, where necessary and where appropriate, by the unique circumstances in 2022. On a course-by-course basis, SQA has determined grade boundaries in a way that is fair to candidates, taking into account how the assessment (exams and coursework) has functioned and the impact of assessment modifications and revision support.

The grade boundaries used in 2022 relate to the specific experience of this year's cohort and should not be used by centres if these assessments are used in the future for exam preparation.

For full details of the approach please refer to the National Qualifications 2022 Awarding — Methodology Report.

