

Moderators' report

A LEVEL

DESIGN AND TECHNOLOGY: DESIGN ENGINEERING

**OCR Level 3 Advanced GCE in Design and
Technology: Design Engineering**

H404

For first teaching in 2017

H404/03/04 Summer 2025 series

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Introduction

Our Moderators' reports are produced to offer constructive feedback on centres' assessment of moderated work, based on what has been observed by the moderation team. These reports include a general commentary of accuracy of internal assessment judgements, identify good practice in relation to evidence collation and presentation, and comment on the quality of centre assessment decisions against individual Learning Objectives. The report also highlights areas where requirements have been misinterpreted and provides guidance to centre assessors on requirements for accessing higher mark bands. Where appropriate, the report will also signpost other sources of information that centre assessors will find helpful.

OCR completes moderation of centre-assessed work in order to quality assure the internal assessment judgements made by assessors within a centre. Where OCR cannot confirm the centre's marks, we may adjust them in order to align them to the national standard. Any adjustments to centre marks are detailed on the Moderation Adjustments report, which can be downloaded from Interchange when results are issued. Centres should also refer to their individual centre report provided after moderation has been completed. In combination, these centre-specific documents and this overall report should help to support centres' internal assessment and moderation practice for future series.

Online courses

We have created online courses to build your confidence in delivering, marking and administering internal assessment for our qualifications. Courses are available for Cambridge Nationals, GCSE, A Level and Cambridge Technicals (2016).

Cambridge Nationals

All teachers delivering our Cambridge Nationals suite are asked to complete the Essentials for the NEA course, which describes how to guide and support your students. You'll receive a certificate which you should retain.

Following this you can also complete a subject-specific Focus on Internal Assessment course for your individual Cambridge Nationals qualification, covering marking and delivery.

GCSE, A Level and Cambridge Technicals (2016)

We recommend all teachers complete the module on Online courses – NEA for their subject. These courses provide subject-specific information about course content; how to prepare for planning, marking and submitting; and support with understanding the marking criteria.

Accessing our online courses

You can access all our online courses from our teacher support website [Teach Cambridge](#).

These free online courses currently cover the end-to-end NEA process for teachers. You'll find the link to the **Online courses** under the **Assessment** or **Training** tab – hover over **Assessment** or **Training** on the horizontal menu and select **Online courses** from the dropdown.

These self-paced online courses are intended for any teachers. During the course, you will engage with interactive content on subjects such as guidance on unit content, structure and administrative processes.

If you have any queries, please contact our Customer Support Centre on 01223 553998 or email support@ocr.org.uk.

General overview

In similar fashion to the summer series of 2024, we were delighted to receive and moderate some outstanding examples of iterative design in the development of a product, within the Design Engineering endorsed specification.

Candidates who did well generally:	Candidates who did less well generally:
- understood the iterative design journey - had regular contact with their user/stakeholders throughout their iterative design journey - developed their ideas using both physical and digital prototyping methods - included electronics or mechanisms embedded within their final outcomes.	- worked in a linear manner - did not have direct real-time contact with users - demonstrated limited ideas and development.

Mandatory requirement – electronic portfolios

A reminder to centres that electronic portfolios are a **mandatory requirement** with A4/A3 style paper portfolios no longer being acceptable. Many centres either sent work via USB drive or uploaded work and associated forms directly to the Submit for Assessment platform. Either of these work well; the latter is a major step forward in terms of efficiency and it was clear centres found this helpful.

Using unencrypted USB drives can be very useful. However, in the instance where a password is required, please select a short, clear password that avoids easily confusable letters and numbers such as 1 and l, or o and 0.

It is the case that excessive file sizes can be problematic and as such, complex presentations which take a long time loading are counterproductive. So, it is vital for centres to compress all electronic work before uploading. This is a crucial step that should be prioritised by centres. Furthermore, candidates do not need to include a larger number, i.e. over one hundred slides, in their portfolio.

Interactive dialogue is a vital component within the philosophy of this specification. However, there is **absolutely no requirement** for a presentation to have upwards of 15/20 videos embedded. We would not expect a candidate to have more than ten and there is no requirement to have numerous videos on a single page/slide.

Many centres provided a separate folder containing '**clearly labelled**' videos, enabling most moderators to view all video files. It is **preferable** however that this facility is used as a **backup** as viewing videos in context is a far more valuable exercise. Where videos are unable to be embedded within a portfolio, it would be helpful for them to be directly hyperlinked to the source. Several centres made effective use of externally hosted media within candidate portfolios to demonstrate stakeholder interaction, testing and other primary evidence. This reduced the number of excessive file sizes keeping them manageable and easy to access. However, centres should be mindful that the moderator will need full access permissions for any externally hosted media as "access was denied" on several occasions.

Centres should be aware that unless work is required for archiving or awarding purposes then it is our intention to return **all work** that is sent at the end of the moderation series.

Please do not upload individual videos to the Submit for Assessment platform.

NEA Forms and Administration

Centres should be aware that there are only two forms that are required alongside the students work: The Candidate Record Form (**CRF**) and the Candidate Declaration Form (**CDF**).

The CDF must be signed by the respective **student and teacher**.

The CRF is an **interactive form** that **correctly totals** candidate marks for each strand thus avoiding clerical errors. This form **should not** be completed by hand in pencil or pen. Colleagues are urged to use this **digital** form as it saves the moderation team many hours in chasing up on clerical errors that slow the moderation process a great deal.

The CCS160 (Centre Authentication Form) **should not be sent** in with the sample, it should be signed by all teachers involved and retained within the centre as required by JCQ.

Observations and comments on the CRF can be **very helpful**, particularly in indicating where levels had been met and criteria reached.

Marks must be uploaded by **May 15th** at the latest. Work must be sent/uploaded within three days of receipt of the sample request email. It remains a **frustration** following up on work/forms not received in the week following this date and slows the moderation process unnecessarily.

The support of colleagues within centres is appreciated in addressing this in 2026 please.

Key Points

The aim of the moderation process is to make sure that centre assessments meet a common national standard. This is accomplished by adjusting any centre assessment when the moderation process, which is based on the sample of work reviewed, suggests that it is necessary. Following moderation, centres then receive a detailed report, which identifies specific areas of the assessment criteria needing attention, where applicable.

Being overly generous in assessing some areas can have a significant cumulative impact in internally assessed units with multiple sections like these.

We continue to ask that centres encourage their candidates to explore 'engineered' solutions that incorporate electronics/mechanisms or indeed to further solidify their technical understanding.

There are many examples of impressive contexts being explored that include lots of mechanical opportunities that, in turn, offer candidates the chance to apply mathematical content here too.

Likewise, there are also some superb coding examples. However, while we encourage the use and adaptation of sample code, to gain credit programming/coding, candidates should be adapting and writing their own code to complete the task etc.

Misconception



As we reported in the 2024 series some centres are still using the mark scheme to create the slide titles and therefore seemingly being restricted to a linear approach akin to the traditional style of research, design specification, design, develop, prototype and evaluate.

The philosophy at the very heart of this specification is that of iterative design. For example, while undertaking design ideas, candidates are encouraged to further explore by discussing concepts with their user/stakeholder or investigating materials/components or mechanisms to further their design and knowledge. Explore, create, and evaluate is cyclical. Evidence is often apparent throughout a candidate's portfolio and Criteria 1.6 for instance, would not be expected to appear until after the final design solution is finalised.

Strand by strand guidance on H404/5/6 03/04 Product Development requirements

This is not an exhaustive list, and these comments relate directly to the A Level Specification which can be found on the OCR website. Chapter 10 NEA Product Development of the [OCR A/AS Level Design & Technology textbook](#) is particularly informative and is extremely detailed.

Our live training which is specifically directed at the NEA and has many explicit aspects should also be utilised.

We urge you to use these resources, they have been compiled with numerous examples to aid delivery of the NEA.

This Product Development carries 100 marks.

Strand 1 – Explore

OCR suggests approximately 65 hours for completion of this non-exam assessment. This does not present a limit, but it is important to recognise that if candidates are producing excessive work that becomes irrelevant to the context and brief, or is not concise, then this is counterproductive and ultimately does not add to the experience they have nor is it within the ethos of the specification.

The use of primary users/stakeholders is **fundamental** within this endorsed title. Candidates should continually revert to and have **direct** interactions with their primary user/stakeholders in their explorations throughout. Use of a peer taking on the persona of a user is helpful if a user is not available. These interactions should be clearly evidenced within a candidate's portfolio. **Direct** contact should be in the form of real-time/first-hand interactions enabling as much insight as possible to be obtained by the candidates.

A broad range/contrast when exploring possible contexts offers candidates an opportunity to gain valuable insights and further understanding. Involving users/stakeholders in discussions at this stage can also be very useful.

Investigations that explore existing products are significantly more valuable when products are analysed first-hand – disassembly of a broken or old product can be immensely helpful to the understanding of candidates.

The exploration of materials is best employed within the iterative design process and linked/related directly to the ideas/developments that are taking shape. Standalone slides on a list of **generic** materials that bear little relevance to the product chosen are of limited value.

Misconception – Iterative Design

Centres should not lead candidates through the project with generic slide layouts and a formulaic approach to the design process.

This, approach can stifle candidate's innovation and creativity.

Misconception – Technical Specification

There appeared to be some misunderstanding of the technical specification. In essence this should offer sufficient clarity for manufacture of the intended design solution to a third party, so they are able to make a prototype of it themselves. Despite it being termed section 1.6, it actually sits just before manufacture. Working drawings are fundamental to this, as are details of bought in items and the choice of materials.

Technical specification should include a circuit schematic and/or final code if prototype includes electronics/programming.

Strand 2 – Create: Design Thinking

OCR overtly encourages creative and innovative product developments that not only demonstrate a progressive (iterative) design process, but also take into consideration the feedback and requirements of primary users and other stakeholders. It may not always be possible for candidates to work with external people however utilising a member of staff or peer who can impart a realistic persona of the stakeholder is invaluable to offer sufficient feedback and support to the design process.

There were a significant number of candidates that simply fixated on a single idea and subsequently did not explore other ideas that may well have led to a more creative and educational experience for them. A wide range (we suggest 10) and variety of different ideas being presented offers candidates the opportunity to develop their ideas innovatively and with an open mind, in keeping with the iterative philosophy.

Ideas could be across a range of evidence to reflect the aspects of a design engineering project, such as systems diagrams, electronic circuit diagrams, codes, drawings and/or models of mechanisms including the use of construction kits, and drawings/CAD models of system enclosures/packaging.

Where centres clearly support the iterative design approach, that allows freedom to be creative and with several progressive developments of either a whole idea or components within, then the outcomes are often exceptional, meeting the expectation for MB5 with ease. Three-dimensional development can be extremely useful.

2.2 Design Developments

Some development of ideas demonstrated using a variety of methods but often in a very linear fashion. Developing more than one idea is a fundamental aspect of the learning experience, please refer to our training materials for further support.

Quality of modelling was generally good, and CAD was used extensively at the top end. Testing models in real-time in their environment or a given context is still immensely valuable for the iterative design journey.

The use of technical language and understanding is expected when iteratively designing. Simply exploring the use of shapes without any aspirations to understand how the structure behind a given shape is derived or constructed is a missed opportunity at this level.

Strand 3 – Create: Design Communication

Various methods of communication and presentation should be promoted. Candidates are not expected to start an idea's iterative journey with a sketch, although many find this beneficial. The initial phase is intentionally flexible, with sketch modelling and CAD being commonly used techniques that serve as starting points.

When creating electronic systems, breadboarding and circuit CAD simulators can be used to effectively communicate ideas. Construction kits can communicate mechanisms and movement far more effectively and quickly than sketches for many candidates via the use of video evidence.

It is essential that for all evidence to be fully considered through moderation that centres are following the submission guidelines set out in the specification; that file sizes are compacted wherever possible; and all videos and audio files are tested to make sure they are accessible from external devices.

The **real-time** capture of findings and decision making is a crucial element of the NEA and impacts on several key aspects of the marking criteria.

Strand 4 – Create: Final Prototype(s)

Misconception – Planning for making



Planning should occur before the making process begins and cover all requirements and safety considerations identified from the technical specification. It should be relevant to making in a school or centre workshop. Timescales for the various processes are a helpful addition.

If evidencing the use of equipment such as hand tools, machinery, digital design and/or digital manufacture throughout the project is limited then centres should be marking in MB1 for 'Use of specialist tools and equipment'. If they have not evidenced one method and the rest of their work is strong, then marks cannot be given above MB2 for this statement. CAD/CAM is a mandatory element of this specification. It is also important to note that to achieve MB4 and beyond for Criteria 4.3 and 4.4, candidates should demonstrate effective and appropriate use. There were a significant number of impressive outcomes this year that demonstrated a high level of skill and accuracy from candidates. CAD was used effectively across a number of centres to clearly present final design solutions and technical specifications.

There should be sufficient video and photographic evidence of the final prototype(s) to assess or evaluate its quality, viability and/or success. Moderators must be able to view the final prototype with clarity. The quality of photographs particularly of close-up work is important. Where it has been deemed appropriate for a candidate to produce a scaled model as their final prototype, appropriately scaled testing methods should be conducted to support marks given in the higher mark bands in order to determine the solutions viability and feasibility.

Moderators should also be able to clearly **see evidence** to suggest how the product could be viable for the intended market.

Strand 5 – Evaluation

Designing iteratively means constantly analysing and evaluating ideas and solutions, which is key to a candidate's success. Centres should encourage to promote a mindset of continuous improvement

towards the best and most advanced solution for the market and opportunity, considering the available facilities and resources.

It's important to include real-time feedback from primary users and stakeholders, as well as evaluations of others' opinions, to guide the next steps in the design process.

Wider issues such as LCA and the impacts of the product more broadly are often overlooked.

Risk Assessment



Risk assessments had a very broad range of responses. Please do consider health and safety throughout the project. A risk assessment of the prototype product as it would be expected **to be used** is a very useful piece of work that can also highlight inadequacies that can be addressed as part of the further improvements that form part of section 5.5. Candidates often overlook this important area within the actual use of their product.

Testing and analysis should be rigorous and objective. Evidence of the planning and implementation of this should be clearly presented. User/stakeholder testing should always be encouraged with feedback in **real-time** wherever possible. Testing should wherever possible be undertaken in the intended environment for use.

Testing against technical and non-technical requirements is also very useful in identifying strengths and weaknesses. Identifying weaknesses can provide a direction for future modifications.

Further modifications and any opportunities to improve design optimisation are expected within this strand.

Final Points

Centre and candidate name and number must be on all work that is presented.

Slides need to be numbered to aid navigation for centre and moderation process.

Staff/peers acting in the role of user/stakeholder persona is a useful tactic, but this must be clearly articulated and referenced within the portfolio. All work undertaken **must** be by the candidate.

Acknowledging sources, with a bibliography is very helpful. Several candidates also made effective use of referencing external sources by hyperlinking any external images or data tables they had used as reference materials.

The overall ethos for this specification is based on 'real-time recording' of events as they actually happen. Interactive dialogue involves discussing:

- the selected product
- comparative products
- iterative development
- ongoing analysis
- evaluation testing with others
- responding to suggestions made.

Evidence of interaction should be recorded in real-time with the active comments of those involved recorded first-hand and not retrospectively.

Re-typing of first-hand comments is totally counterproductive and should be avoided.

Design Engineering (H404) focuses on engineered and electronic products/systems with their analysis in respect of:

- Function, operation, components and materials
- The selection and use of the above in commercially viable products and/or systems

Most common causes of centres not passing

A common cause of centres not passing is by using generic contexts that do not allow candidates individual exploration of a given scenario or context.

Common misconceptions

1.3 Design Requirements have superseded the former Design specification – lots of detail within the training on offer.

Avoiding potential malpractice

Individual exploration of a context is crucial, and candidates should not share a pre-determined school or centre afforded context.

Helpful resources

It is strongly advised that you make best use of the subject-specific OCR resources and training events that are available through [Teach Cambridge](#) or generic guidance via our [website](#).

For general guidance about **all aspects of report writing and the process**, please take a look at our [‘Examiners’ and Moderators’ reports guide with FAQs’](#) which replaces various other documents.

Refer to this alongside any subject-specific guidance we may send you.

Additional comments

There is a great deal of helpful training available – our training is updated every year and as such centres should make use of this resource. The live presentations with the opportunity to ask one of our most experienced moderators is particularly helpful.

Supporting you

Teach Cambridge

Make sure you visit our secure website [Teach Cambridge](#) to find the full range of resources and support for the subjects you teach. This includes secure materials such as set assignments and exemplars, online and on-demand training.

Don't have access? If your school or college teaches any OCR qualifications, please contact your exams officer. You can [forward them this link](#) to help get you started.

Reviews of marking

If any of your students' results are not as expected, you may wish to consider one of our post-results services. For full information about the options available visit the [OCR website](#).

Access to Scripts

We've made it easier for Exams Officers to download copies of your candidates' completed papers or 'scripts'. Your centre can use these scripts to decide whether to request a review of marking and to support teaching and learning.

Our free, on-demand service, Access to Scripts is available via our single sign-on service, My Cambridge. Step-by-step instructions are on our [website](#).

Keep up-to-date

We send a monthly bulletin to tell you about important updates. You can also sign up for your subject specific updates. If you haven't already, [sign up here](#).

OCR Professional Development

Attend one of our popular professional development courses to hear directly from a senior assessor or drop in to a Q&A session. Most of our courses are delivered live via an online platform, so you can attend from any location.

Please find details for all our courses for your subject on **Teach Cambridge**. You'll also find links to our online courses on NEA marking and support.

Signed up for ExamBuilder?

ExamBuilder is the exam paper builder platform for a range of our qualifications. [Find out more](#).

Free for all OCR centres with an Interchange account, it allows unlimited users per centre. We require an [Interchange](#) username to verify your centre's users for ExamBuilder.

If you do not have an Interchange account, please contact your centre administrator (usually the Exams Officer) to request a username.

Once you have an Interchange username, use the form on [this page](#) to sign up for ExamBuilder, or ask an existing user at your centre to create an ExamBuilder account for you.

Active Results

Review students' exam performance with our free online results analysis tool. It is available for all GCSEs, AS and A Levels and Cambridge Nationals (examined units only).

[Find out more](#).

Online courses

Enhance your skills and confidence in internal assessment

What are our online courses?

Our online courses are self-paced eLearning courses designed to help you deliver, mark and administer internal assessment for our qualifications. They are suitable for both new and experienced teachers who want to refresh their knowledge and practice.

Why should you use our online courses?

With these online courses you will:

- learn about the key principles and processes of internal assessment and standardisation
- gain a deeper understanding of the marking criteria and how to apply them consistently and accurately
- see examples of student work with commentary and feedback from OCR moderators
- have the opportunity to practise marking and compare your judgements with those of OCR moderators
- receive instant feedback and guidance on your marking and standardisation skills
- be able to track your progress and achievements through the courses.

How can you access our online courses?

Access courses from [Teach Cambridge](#). Teach Cambridge is our secure teacher website, where you'll find all teacher support for your subject.

If you already have a Teach Cambridge account, you'll find the link to the **Online courses** under the **Assessment** or **Training** tab – hover over **Assessment** or **Training** on the horizontal menu and select **Online courses** from the dropdown.

If you don't have a Teach Cambridge account yet, ask your exams officer to set you up – just send them this [link](#) and ask them to add you as a Teacher.

Access the courses **anytime, anywhere and at your own pace**. You can also revisit the courses as many times as you need.

Which courses are available?

We recommend all teachers complete the module on Online courses – NEA for their subject. These courses provide subject-specific information about course content; how to prepare for planning, marking and submitting; and support with understanding the marking criteria.

The subject-specific courses are tailored for each qualification that has non-exam assessment (NEA) units, except for AS Level and Entry Level. They cover the following topics:

- the structure and content of the NEA units
- the assessment objectives and marking criteria for the NEA units
- examples of student work with commentary and feedback for the NEA units
- interactive marking practice and feedback for the NEA units.

We are also developing courses for some of the examined units, which will be available soon.

How can you get support and feedback?

If you have any queries, please contact our Customer Support Centre on 01223 553998 or email support@ocr.org.uk.

We welcome your feedback and suggestions on how to improve the online courses and make them more useful and relevant for you. You can share your views by completing the evaluation form at the end of each course.

Tell us what you think

Your feedback plays an important role in how we develop, market, support and resource qualifications now and into the future. We want you and your students to enjoy and get the best out of our qualifications and resources, but to do that we need your honest opinions to tell us whether we're on the right track or not.

You can email your thoughts to resources.feedback@ocr.org.uk or visit our [feedback page](#) to learn more about how you can help us improve our resources.



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