



# GCSE (9-1) Design and Technology

## NEA Delivery Guide

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Pearson Edexcel Level 1/Level 2 GCSE (9-1) in Design and Technology (1DT0)

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*First teaching from September 2017*

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*First certification from 2019*

| Issue 2

## Table of Content

<a href="#"><u>Introduction</u></a>	3
<a href="#"><u>Content and Assessment Overview</u></a>	4
<a href="#"><u>Identifying suitable NEA projects at GCSE Level</u></a>	5
<a href="#"><u>The role of the teacher</u></a>	6
<a href="#"><u>Exemplar Library</u></a>	7
<b>Investigate</b>	
1.1 <a href="#"><u>Investigation of needs and research</u></a>	8
1.2 <a href="#"><u>Specification</u></a>	12
<b>Design</b>	
2.1 <a href="#"><u>Design ideas</u></a>	15
2.2 <a href="#"><u>Review of initial ideas</u></a>	18
2.3 <a href="#"><u>Development of design ideas into a chosen design</u></a>	20
2.4 <a href="#"><u>Communication of design ideas</u></a>	24
2.5 <a href="#"><u>Review of chosen design</u></a>	26
<b>Make</b>	
3.1a <a href="#"><u>Manufacture – selection of materials</u></a>	28
3.1b <a href="#"><u>Manufacture – skills and processes</u></a>	28
3.2 <a href="#"><u>Quality and accuracy</u></a>	32
<b>Evaluate</b>	
4.1 <a href="#"><u>Testing and evaluation</u></a>	35

# GCSE Design and Technology – NEA Guide

## Introduction

The purpose of the NEA component is for candidates to:

- Carry out investigation into a problem linked to a contextual challenge.
- Identify a suitable brief and set of specification criteria.
- Design a range of solutions and develop one of these for manufacture.
- Manufacture a prototype to a high level of accuracy.
- Test and evaluate the solution against the specification.

The term ‘prototype’ means an appropriate working solution to a user need or want, that is sufficiently developed to be tested and evaluated. It can be a:

1. Full-sized product.
2. Scaled working model.
3. Architectural model.
4. Functioning system.

The assessment of the NEA focuses on the student’s ability to apply their skills, knowledge and understanding of D&T, both breadth and depth, to an open contextual challenge.

The NEA requires students to carry out a single project that is identifiable against one of the contextual challenges, which are released on the 1<sup>st</sup> of June before the assessment window the following May.

### **About the contextual challenges**

There are 3 themes, and each theme has 2 contextual challenges, a total of six to choose from. Candidates must choose one of these six contextual challenges from the appropriate release, and follow an iterative design and make process, which is chronologically recorded into a digital portfolio.

### **About this delivery guide**

This delivery guide will take you through each assessment grid in order. Whilst the grids appear linear, marks can often be awarded for evidence found across the entire digital portfolio. Where this is not the case, this is to avoid double crediting candidates in two or more grids for the same work.

### **Generative Artificial Intelligence and coursework**

It is important in the context of AI use that centres engage with JCQ guidance about AI within coursework including D&T NEA, and review where there is appropriate opportunity for its use not to replace student work, but to enhance student approaches to this creative project. Please review the following guidance for general coursework guidance relating to AI.

[AI Use in Assessments: Protecting the Integrity of Qualifications Information for candidates Coursework assessments](#)

# GCSE Design and Technology – NEA Guide

## Content and assessment overview

The Pearson Edexcel Level 1/Level 2 GCSE (9-1) in Design and Technology non-examined assessment component must be completed between the June of the release and May of the following year.

Component 2: Non-examined assessment (Paper code: 1DT0/02).

Non-examined assessment is 50% of the qualification (Maximum of 100 marks)

### Content Overview

There are four parts to the assessment:

#### – Investigate

This includes investigating design possibilities through research involving a user/client, the identification of a suitable design brief, and writing of a specification.

#### – Design

This includes producing different design ideas, reviewing these ideas against the specification and with a user/client, refining and developing a chosen design, the review of the chosen design, and the communication of design ideas through written, CAD and graphical methods.

#### – Make

This includes selecting appropriate materials and component parts, the manufacture of the solution evidencing skills and processes, and a focus on quality and accuracy.

#### – Evaluate

This includes testing of the made solution against measurable and technical criteria from the specification, and reflective analysis and evaluation, including a life cycle analysis (LCA).

### Assessment overview

Students will undertake a project in relation to one of six possible contextual challenges, which are released as a document on the 1<sup>st</sup> of June by Pearson Edexcel, one year before certification.

This document can be found by visiting the [qualification page](#).

The project will test students' skills in investigating, designing, manufacturing, and evaluating, with significant priority of marks given to the design and make activities as shown below.

The NEA is internally assessed and externally moderated.

The marks are awarded as follows:

– **Investigate** (16 marks)

– **Design** (42 marks)

– **Make** (36 marks)

– **Evaluate** (6 marks)

# GCSE Design and Technology – NEA Guide

## Identifying suitable NEA projects for GCSE age students and supporting an iterative approach

Candidates are required to identify a design opportunity and to create a portfolio of work that will lead to a testable prototype outcome, by approaching the NEA in the following ways:

- Investigation work should be open and divergent, looking for opportunities, identifying requirements, and resulting in a detailed brief and specification. Further investigation is required to support the development of a chosen design later in the portfolio.
- Brief and specification writing needs to be convergent, aiming to identify a design opportunity that is suitably challenging for the candidate, but not predefined to a specific solution. The specification criteria will need to be a balance of required (must/should) statements (against which testing can verify performance of the outcome), and open (could/may) type statements, which provide scope to solve the problem in different ways.
- Designing ideas should be a divergent task where possibilities are explored. During the development of an idea into a chosen design (for making), divergent approaches should explore possible solutions for aspects of the design which need improvement. Over the course of development this will result in changing design which eventually feels ready to prototype.
- Reviewing design ideas and the review of chosen design idea are both activities where subjective and objective critique take place. The purpose of review is to arrive at a final design that meets the specification criteria. This is best achieved when involving the user/client, who can influence the solution decisions made by the candidate.
- Selection of materials, skills, processes, quality, and accuracy associated with the manufacture of the prototype, are the candidates' opportunities to showcase their ability to apply D&T knowledge, skill and understanding to a make task. Making evidence should aim to communicate in as much detail as possible, the journey that has taken place in a school workshop environment and witnessed by the teacher.
- Testing offers the opportunity to use the prototype that has been made and reflect on how successful it performs against the specification. Does testing prove that the user/client needs have been met, and does the solution solve the identified problem? Testing against the measurable and performance related specification criteria creates the conditions for the student to validate their choices and approach to solving the problem.
- Evaluation offers opportunity for candidates to reflect upon the solution generated to solve the identified problem, reviewing how they met the specification, and considering the environmental impact of the prototype.

# GCSE Design and Technology – NEA Guide

## The role of the teacher at the start of the NEA and throughout

In order for candidates to have the opportunity to experience the breadth of opportunity of the NEA, and have access to all of the assessment grids, the teacher is required to support candidates in identifying suitably challenging opportunities to focus on, related to students choice of one of the six contextual challenges.

Once a contextual challenge has been chosen, candidates are expected to take ownership of all aspects of the project. Teachers can, during the early stages of brief setting, support candidates through questioning, to identify a suitable challenge that is within the capabilities of the candidate and is a suitable level of demand commensurate with the KS4 programme of study.

Candidate work can be completed digitally or converted from physical to digital prior to submission. Teachers are expected to provide suitable levels of control over the portfolio throughout the project, to ensure that a students' work can be verified as being produced by that candidate. Where it cannot, it must be referenced within the CAB ([Candidate Assessment Booklet](#)) to clarify assessment decisions made by the centre, which will be moderated by Pearson Edexcel.

Students are not penalised in relation to the number of pages of evidence they produce for the NEA. Portfolios of excessively high numbers of pages, where a significant amount of the work is unsuitable for credit, will restrict a candidate's ability to produce credit worthy evidence within an appropriate time frame for a GCSE NEA project. It is important to ensure that all work submitted is credit worthy or supports communication of the candidates' journey through the NEA, for assessment purposes.

In this delivery guide, we explain how each assessment grid has been designed alongside the content in the specification relating to NEA (page 55 onwards), and expand on each grid, to explain how we differentiate between levels within the grid. These are set against a national standard for GCSE D&T, and this guide aims to support both new and experienced teachers in understanding how they can best support students completing the NEA.

For each grid, we provide:

- An expansion of the NEA content in the course specification.
- Clarification of how student work is differentiated by level for each assessment grid.
- Explicit reference to where legacy approaches receive no credit for this qualification.
- Links to up-to-date exemplars for each grid, split out by level, and produced by candidates for this qualification.
- Links to full portfolio exemplars with commentary, also produced by candidates for this qualification.
- Reference to where evidence can be written, audio or video, to support a range of candidate approaches.
- Advice on what is a suitable level of demand for each grid in terms of evidence (volume, complexity, etc).

# GCSE Design and Technology – NEA Guide

## Exemplar Library

To complement this delivery guide, the Pearson website provides a GCSE Design and Technology (9-1) exemplar library, which can be found using [this live link](#) and is shown below.

The screenshot shows the Pearson website's Exemplar Library page for GCSE Design and Technology (9-1) from 2017. The page features a navigation menu with options like 'Specification', 'Course materials', 'Published resources', 'Teaching support', and 'Exemplar Library'. The main content area includes the Pearson Edexcel logo, a breadcrumb trail, and a heading 'Pearson Edexcel GCSE Design and Technology (9-1) from 2017'. A text block explains that the exemplar library is designed for accessibility and ease of use. A large image of a paper airplane is shown. On the right, a sidebar titled 'On this page' lists links for 'Investigate', 'Design', 'Make', and 'Evaluate'. Below the main text, there is a section titled 'Exemplar library' with a description of the materials and a link to the '1.1 Delivery guide'.

Throughout this delivery guide you will find live links which take you directly to grid related exemplars. For each grid we have provided an exemplar for each level, with a commitment to expanding the range of exemplars to cover as many different material approaches moving forward. Each grid related page appears as shown below, with expanding accordions to reveal the exemplars available.

This screenshot shows a specific page within the Exemplar Library for '1.1 Investigation of needs and wants'. It features a navigation menu and a breadcrumb trail. The main content area includes a heading '1.1 Investigation of needs and wants' and a description of the materials. A sidebar on the right lists the sections: '1. Investigate', '1.1 Investigation of needs and research', '1.2 Specification', '2. Design', '3. Make', and '4. Evaluate'. The main content area has three expanding accordions for 'Level 3', 'Level 2', and 'Level 1'. Each level accordion shows a PDF document titled '1.1 Investigation of needs and research - Level [X] (PDF | [X] MB) From summer 2023 series'.

For teachers interested in viewing full portfolios, please visit the [course materials section](#) of the website, under “Exemplar material”.

# 1 - Investigate

## 1.1 Investigation of needs and research (AO1 8 marks)

### Exemplars of 1.1 Investigation of needs and research

Use [this live link](#) to view the latest exemplar materials for this assessment grid.

Stage	What students need to do:
<b>1.1 Investigation of needs and research</b>	1.1a Identify the needs of the end user.
	1.1b Outline a design problem from the context provided and identify a need for a product that could solve the problem.
	1.1c Investigate existing products to inform the product specification for the prototype, from past and present designers.
	1.1d Carry out a range of research strategies to gather relevant information, to inform the design specification for the prototype, including: <ul style="list-style-type: none"> <li>a market research</li> <li>b research into the context in which the prototype will be used</li> <li>c research into other possible materials</li> <li>d any sustainability issues that will be considered relevant to the intended prototype.</li> </ul>

### What the NEA content requires students to do:

#### 1.1a Identify the needs of the end user

Students should identify an end user/client or group of users associated with their chosen contextual challenge and may be able to do so at the start of the project, or after other investigation work has taken place. They should be people with whom the student can work with throughout the NEA. The role of the user/client is to influence the decisions made throughout the project. This may include when the student is designing, developing, testing, and evaluating. Each is an opportunity for real people to provide their preferences, requirements, or priorities in order to influence the final outcome.

#### 1.1b Outline a design problem from the context provided and identify a need for a product that could solve the problem.

Students should identify a need for a problem they can solve. The teacher is permitted to support students in order that this problem is of a suitable level of demand. It must relate to the chosen contextual challenge. The problem, which will be formalised into a design brief in 1.2 evidence, should represent a problem that is not too open and broad that it cannot be solved, but not too closed that the solution either already exists or is clearly stated in the wording of the brief.



# GCSE Design and Technology – NEA Guide

## 1.1c Investigate existing products to inform the product specification for the prototype, from past and present designers.

The investigation evidenced by the student will inform the writing of a list of specification criteria, against which design ideas will be generated. Students will need to analyse relevant existing products associated with the problem and contextual challenge and do so with a set of key terms to focus their analysis. These could include:

Point to Analyse	Question
Form	Why is the product shaped or styled as it is?
Function	What does it do?
Client and user	How does it meet the needs?
Performance	How does it work? How does it do the job it was designed to do?
Materials and Components	What materials/components / parts have they used and why
Scale of Production and Cost	What scale of production has been used? How does this affect the overall cost?
Sustainability	How has sustainability been taken into consideration?
Aesthetics	How is it made to be aesthetically pleasing?
Marketability	What makes this product different from anything else on the market?
Consideration of Innovation	What elements of the product are innovative or move the product forward compared to other versions available on the market?

Students may choose to include research into past or present designers and will benefit from a teachers guidance as to the relevance of their intentions for this research activity. This activity done well is useful when it relates to the problem and supports students to write specification criteria. Without this link to the context, evidence of this nature is typically not credit worthy.

## 1.1d Carry out a range of research strategies to gather relevant information...

Including existing products, user research and (only if appropriate) past and present designer research, it will be suitably demanding for students to have:

- Produced a total of 4-5 detailed pieces of relevant research.
- Carried out and evidenced primary research activities such as an interview, a group survey, the observation of a task being carried out, or an environment analysis.
- Ensured material and sustainability research are not specific yet and are only early-stage activities relating to a yet to be designed solution.

A research summary is a useful way to draw together the various insights students have gathered, into a single reflective statement.

### Advice for scaled outcome projects

If the student has committed to a project where the making will be a scaled outcome (e.g. architecture), research should relate to scale model approaches. This will lead to the writing of technical and measurable specification criteria associated with a scaled outcome, and a brief which states the intention to work to a scale.

## GCSE Design and Technology – NEA Guide

Level	Mark	1.1 Investigation of needs and research (AO1 8 marks)
	0	No rewardable material.
<b>Level 1</b>	1–3	<ul style="list-style-type: none"> <li>Evidence of limited investigation and identification of partially relevant design possibilities, which are partially justified in relation to the contextual challenge.</li> <li>Basic assessment of user needs and wants and the requirements of the prototype in response to the contextual challenge, with limited appropriate reference to form and function.</li> <li>Superficial evidence of links between the design requirements and the research undertaken in relation to the contextual challenge.</li> </ul>
<b>Level 2</b>	4–6	<ul style="list-style-type: none"> <li>Evidence of adequate investigation and identification of some relevant design possibilities, which are mostly justified in relation to the contextual challenge.</li> <li>Mostly developed assessment of user needs and wants and the requirements of the prototype in response to the contextual challenge, with some appropriate reference to form and function.</li> <li>Some developed evidence of links between the design requirements and the research undertaken in relation to the contextual challenge.</li> </ul>
<b>Level 3</b>	7–8	<ul style="list-style-type: none"> <li>Evidence of developed investigation and identification of relevant design possibilities, which are fully justified in relation to the contextual challenge.</li> <li>Developed assessment of user needs and wants and the requirements of the prototype in response to the contextual challenge, with fully appropriate reference to form and function.</li> <li>Fully developed evidence of links between the design requirements and the research undertaken in relation to the contextual challenge.</li> </ul>

### How this assessment grid differentiates student evidence of Investigation

Student evidence for investigation differentiates based upon the following factors, which should be accounted for in how students approach the activities in their research. Good research will help students come up with a range of design opportunities, and with engagement with a user/client or group of users, help to design a solution that will solve a genuine problem. Potential materials, sustainability factors, and any considerations that will result in the writing of a suitable design brief and design specification are also useful research activities. What to consider when differentiating the quality of investigation work:

- Whether the research is relevant to the contextual challenge and/or the emerging problem. (i.e. If evidence is not relevant to the chosen contextual challenge, it will not receive any credit)
- Whether user/client engagement is authentic (i.e. a real person external to the school, or a school based peer/teacher acting as a real user or roleplaying as a user) or fictitious (i.e. a completely hypothetical person neither real or roleplay). A real person is capable of providing authentic feedback during the project than the student artificially creating feedback.

## GCSE Design and Technology – NEA Guide

3. Whether research supports iteration or presents specific and premature identification of the solution. (e.g. “I am going to design” statements, specific material and process data, the inclusion of generic anthropometric data, are all examples where evidence suggests that the student has already decided upon the solution, and is prematurely able to state what it is, how it will be made, and that it will involve a specific demographic data set of generic measurements).

### **How to avoid double crediting**

Evidence in relation to any research that occurs after design ideas (i.e. research that takes place after the review of initial ideas 2.2) cannot be credited in grid 1.1 Investigation. This is because this evidence will be credited in grid 2.3, Development of design ideas into a chosen design, for which there are 4 marks available for research (AO1).

When completing the CAB, the assessor should avoid crediting evidence of investigation that appears after the specification has been written for grid 1.1, and instead credit this work in grid 2.3.

# GCSE Design and Technology – NEA Guide

## 1.2 Product Specification (AO1 8 marks)

### Exemplars of 1.2 Specification

Use [this live link](#) to view the latest exemplar materials for this assessment grid.

Stage	What students need to do:
<b>1.2 Product specification</b>	<b>1.2a</b> Production of a design brief, that addresses all needs previously identified.
	<b>1.2b</b> Production of a product specification that includes statements that are technical, measurable and justified, and include consideration of:  a form b function c user requirements d performance requirements e material and component requirements f scale of production g cost h sustainability.
	<b>1.2c</b> Identification of criteria, which will be used to evaluate the success of the prototype.

### What the NEA content requires students to do:

#### 1.2a Production of a design brief, that addresses all needs previously identified

Students are required to write a clear and concise design brief. It needs to refer to the needs and wants of the identified user/client or user group that appears in the evidence for grid 1.1 Investigation. The brief must be identifiable to the chosen contextual challenge, and sufficiently open that it does not define a detailed solution to the identified problem.

#### 1.2b Production of a product specification that includes statements that are technical, measurable and justified, and include a number of recommended considerations.

Students are required to write a list of specification criteria that are realistic in their expectation and justified by connecting to the investigation work the student completed for 1.1. Criteria should use D&T subject language where appropriate and ensure a suitable number of the criteria are measurable. Measurable criteria will help to validate the final prototype when the student creates tests for those criteria. There must be criteria that propose what the performance requirements of the final prototype should be.

The list of specification criteria evidence will typically be one page of the portfolio. It is a very important piece of work, because of the ongoing touch points that students will make back to these criteria throughout the project. This includes the following points, that students should be aware of:

## GCSE Design and Technology – NEA Guide

1. Form and Function criteria will be used to generate the design ideas and development of design ideas. Functionality criteria will also link to the testing that will take place in evidence for 4.1.
2. Material and sustainability criteria (at this very early-stage of consideration) will begin to shape decisions relating to design ideas and the development of design ideas and may influence specific material choices made for 3.1a. Sustainability criteria could be appropriate to refer back to during the LCA requirement of grid 4.1.
3. Measurable/testable/technical criteria are expected to be must/should statements, against which a test can be conducted for grid 4.1 evidence.
4. Materials, components, scales of production and cost related criteria are expected to be “could” statements which are not specific. Students will be able to show subject knowledge in these criteria in the specification but will become more specific about these as they move closer to a final design, which may appear in annotation.
5. Manufacturing criteria such as those relating to materials or components, are not required to appear in a separate “Manufacturing Specification” which was a legacy requirement.

### Second Specifications

If after additional and credit worthy research is evidenced in 2.3 development work, students may want to include a revised list of specification criteria as a slide, and would benefit from seeking teacher guidance on this. If a revised specification appears in the portfolio, teachers should credit this evidence against 1.2, and signposted it in the CAB.

### Advice for scaled outcome projects

If the student has committed to a scaled outcome (e.g. architecture), and carried out research related to scaled outcomes for 1.1, it is expected (in this instance) that the list of specification criteria will be written for a scaled outcome, not a full size version. i.e. the specification should be a continuation of the research the student has carried out.

### 1.2c Identification of criteria, which will be used to evaluate the success of the prototype

As stated in section 1.2b above, criteria which will be used to test the final prototype should be:

- a) Measurable or technical.
- b) Written as must/should statements.
- c) Be realistic and authentic.
- d) Be justified by investigation evidence in 1.1.

## GCSE Design and Technology – NEA Guide

Level	Mark	1.2 Specification (AO1 8 marks)
	0	No rewardable material.
<b>Level 1</b>	1–3	<ul style="list-style-type: none"> <li>• Basic design brief that demonstrates a simplistic response to the contextual challenge, addressing some of the investigated needs and wants of the user.</li> <li>• Limited range of specification points that are basic and partially measurable, based on a superficial investigation of research in relation to the contextual challenge.</li> <li>• Basic justification of the performance requirements for the product in relation to the contextual challenge.</li> </ul>
<b>Level 2</b>	4–6	<ul style="list-style-type: none"> <li>• Generally sound design brief that demonstrates a coherent response to the contextual challenge, addressing many of the investigated needs and wants of the user.</li> <li>• Mostly developed range of specification points that are realistic and mostly measurable, based on a mostly relevant investigation of research in relation to the contextual challenge.</li> <li>• Generally sound justification of the performance requirements for the product in relation to the contextual challenge.</li> </ul>
<b>Level 3</b>	7–8	<ul style="list-style-type: none"> <li>• Fully sound design brief that demonstrates a realistic response to the contextual challenge, addressing most of the investigated needs and wants of the user.</li> <li>• Fully developed range of specification points that are realistic, technical and measurable, based on a fully relevant investigation of research in relation to the contextual challenge.</li> <li>• Fully sound justification of the performance requirements for the product in relation to the contextual challenge.</li> </ul>

### How this assessment grid differentiates student evidence of specifications:

Specification evidence is differentiated based upon the following factors, which should be accounted for in how students approach this evidence:

1. Whether the specific (must, should) criteria can be identified by evidence in 1.1 investigation (i.e. can and has the student justified the criteria).
2. Whether the nonspecific (could, may) criteria are suitable for the creation of a range of different design ideas (i.e. not an already identifiable solution, or very narrow opportunity to design a range of different ideas).
3. Whether criteria that will become a test in 4.1 evidence are realistic, measurable, and authentic. (i.e. can the student test their final prototype and validate its success using these criteria as hypothetical requirements).
4. Whether the design brief is written in a way that offers opportunity for divergent solutions, or does it lead to a narrow/specific solution only. (i.e. it is already clear from the brief what the solution will be)?

## 2- Design

### 2.1 Design ideas (AO2 8 marks)

#### Exemplars of 2.1 Design ideas

Use [this live link](#) to view the latest exemplar materials for this assessment grid.

Stage	What students need to do:
<b>2.1 Design ideas</b>	2.1a Production of a range of design ideas that address the criteria in the design brief and product specification.
	2.1b Consideration of a range of issues when producing the design ideas, including: <ul style="list-style-type: none"> <li>a budget</li> <li>b aesthetics</li> <li>c cultural issues</li> <li>d sustainability issues.</li> </ul>
	2.1c Exploration of different design approaches, including: <ul style="list-style-type: none"> <li>a materials</li> <li>b components</li> <li>c processes</li> <li>d techniques.</li> </ul>

#### What the NEA content requires students to do:

##### 2.1a Production of a range of design ideas that address the criteria in the design brief and product specification.

Students are required to produce 3-4 quality design ideas. Each should be visibly different, able to meet the needs and wants of the user/client or user group and solve the identified problem (as set out in the design brief). Communication of design ideas can be through sketching, modelling, and/or computer aided design (all of which will gain credit for grid 2.4 Communication). All designs will require written evidence in addition.

Students are free to approach the design task as they choose. The specific design strategies of collaboration, user centred design and systems thinking (1.16.1 of core content) would appear through design ideas by:

- **Collaboration** - designing with a user/client as a joint activity.
- **User centred design** - design ideas which focus on the user/client needs and wants.
- **Systems thinking** - design ideas that consider how the solution connects to other products or services (e.g. considering how a product might be recharged using a wall socket, the retail packaging of a product, or how the product is to be disassembled for recycling are all examples of systems thinking).

# GCSE Design and Technology – NEA Guide

## 2.1b Consideration of a range of issues when producing the design ideas.

Students will be able to show considerations of budget, aesthetics, and cultural and sustainability issues, through written annotation. Written evidence can be complemented through audio or video media.

## 2.1c Exploration of different design approaches.

Students will be able to show exploration of materials, components, processes, and techniques through annotation. It is likely that design ideas will convey these elements through graphical sketching, modelling, and/or CAD. At the design ideas stage, materials, components, processes, and techniques will all still be at an early consideration phase.

Level	Mark	2.1 Design ideas (AO2 8 marks)
	0	No rewardable material.
<b>Level 1</b>	1–3	<ul style="list-style-type: none"><li>• Basic selection and use of design strategies to inform decisions to generate a limited range of simplistic design ideas in response to the contextual challenge.</li><li>• Limited consideration for the user needs and specification parameters.</li><li>• Ideas demonstrate a basic understanding of some materials and processes.</li></ul>
<b>Level 2</b>	4–6	<ul style="list-style-type: none"><li>• Generally appropriate selection and use of design strategies to inform decisions to generate a range of design ideas in response to the contextual challenge.</li><li>• Generally sound consideration for the user needs and specification parameters.</li><li>• Ideas demonstrate a generally sound understanding of relevant materials, processes and techniques.</li></ul>
<b>Level 3</b>	7–8	<ul style="list-style-type: none"><li>• Fully appropriate selection and use of design strategies to inform decisions to generate a wide range of design ideas in response to the contextual challenge.</li><li>• Fully sound consideration for the user needs and specification parameters.</li><li>• Ideas demonstrate a fully sound understanding of relevant materials, processes and techniques.</li></ul>

### How this assessment grid differentiates student evidence of design ideas.

Design idea evidence is differentiated based upon a number of factors, which should be accounted for in how students approach the generation of evidence. The following questions will help students to consider how they present their design idea evidence:

1. Are sketches (both in 2.1 and 2.3 evidence) a suitable size on the page or have they produced thumbnails which lack detail?
2. Are sketches created with clear linework or are they hard to decipher? (both physical and digital)
3. Are all of the design ideas different solutions to solving the problem, or are they very similar to one another, with minor differences apparent (i.e. design fixation)?



## GCSE Design and Technology – NEA Guide

4. Has CAD been used appropriately alongside sketches to convey design ideas, or is the candidate lacking evidence of sketching? (i.e. is there a balance of skills on show?).
5. Is annotation around all of the design ideas appropriate to where the student is in the project? (i.e. has the student fixated onto specific materials, components, processes and techniques, or do they remain open to exploring the choices they still have?).

# GCSE Design and Technology – NEA Guide

## 2.2 Review of initial ideas (AO3 8 marks)

### Exemplars of 2.2 Review of initial ideas

Use [this live link](#) to view the latest exemplar materials for this assessment grid.

Stage	What students need to do:
<b>2.2 Review of initial ideas</b>	2.2a Analysis and evaluation of how each design idea meets the design brief and product specification.
	2.2b Determine which designs follow the design brief and product specification and should be taken forward for development.
	2.2c Modification of design ideas to fit the design brief and product specification.

### What the NEA content requires students to do:

#### 2.2a Analysis and evaluation of how each design idea meets the design brief and product specification.

Students are required to review all of the design ideas they produced for evidence in 2.1. They are strongly encouraged to involve the user/client or user group in making decisions in relation to their chosen design to develop further in 2.3. Students are required to review all of their ideas for 2.2 in order to arrive at an authentic decision of one design they will develop for 2.3 evidence.

#### More than one design progressing to development

If the student wants to develop more than one design idea from 2.1, the separate ideas should be combined so that only one solution is being developed and gaining credit for grid 2.3.

Review of initial ideas evidence should compare each design objectively against each of the specification criteria from 1.2 evidence. Students may wish to:

1. Organise their analysis into a table using the specification criteria along an axis, as a way of managing this activity onto 1 or at most 2 pages.
2. State whether each design meets, partially meets, or does not meet each criterion, and justify each of these decisions (ideally based upon user/client feedback).
3. Use an objective scoring system to support the decision of a chosen design idea, alongside the user/client feedback. For example, a colour-based system (e.g. RAG), numbers, or another method to visually communicate the overarching suitability of each design against the full list of specification criteria (A referencing system alone will be highly subjective and therefore insufficient, please see “How this assessment grid differentiates student evidence of review of initial ideas” below for further clarification).

It is important that the chosen design that will be developed is clearly identifiable, and it is clear why this decision has been made in relation the specification criteria. This includes identifying which criteria were only partially or not met and will form the focus of the development.

## GCSE Design and Technology – NEA Guide

Level	Mark	2.2 Review of initial ideas (AO3 8 marks)
	0	No rewardable material.
<b>Level 1</b>	1–3	<ul style="list-style-type: none"> <li>• Superficial analysis of design ideas in response to the contextual challenge, which considers basic factors and makes limited connections between elements of the design.</li> <li>• Basic evaluation of design ideas leading to a limited refinement and development of designs, demonstrating a limited understanding of design considerations.</li> </ul>
<b>Level 2</b>	4–6	<ul style="list-style-type: none"> <li>• Generally developed analysis of design ideas, leading to appropriate refinement and development of designs, which considers appropriate factors and makes mostly relevant connections between elements of the design.</li> <li>• Competent evaluation of design ideas leading to appropriate refinement and development of designs, demonstrating a mostly sound understanding of design considerations.</li> </ul>
<b>Level 3</b>	7–8	<ul style="list-style-type: none"> <li>• Fully developed analysis of design ideas leading to effective refinement and development of designs, which considers comprehensive factors and makes fully relevant connections between elements of the design.</li> <li>• Effective evaluation of design ideas leading to considered refinement and development of designs, demonstrating a fully sound understanding of design considerations.</li> </ul>

### How this assessment grid differentiates student evidence of review of initial ideas:

Review of initial ideas evidence is differentiated by the quality of the students analysis and evaluation work. This will explain the decisions made to move from a wide range of design ideas to one solution, which will then be developed until it is suitable for manufacture. Considerations for appropriate levelling will include:

1. Whether the user is involved in making decisions about how designs meet, partially meet, or do not meet the specification, rather than being based upon the personal view of the student.
2. Whether the referencing system (colour or otherwise) is complementary to the analysis and justification evidence or used in place of it. This would be seen through a lack of justification of the decisions that have been made.
3. Whether it is clear which design (or combination of designs) have performed best against the specification criteria, where they still require improvement (which will be the focus in the development), and why the final choice for development is the most appropriate.
4. Whether ideas are reviewed in isolation to one another, or against one another to find the strongest solutions across the range of design ideas.

# GCSE Design and Technology – NEA Guide

## 2.3 Development of design ideas into a chosen design (AO1 4 marks, AO2 8 marks)

### Exemplars of 2.3 Development of design ideas into a chosen design

Use [this live link](#) to view the latest exemplar materials for this assessment grid.

Stage	What students need to do:
<b>2.3 Development of design ideas into a chosen design</b>	2.3a Consideration of user group needs and preferences, of design ideas, conducting further research where necessary.
	2.3b Consideration of the design as a whole, rather than focussing on component parts in isolation.
	2.3c Modelling/simulation used to test the features of the design ideas.
	2.3d Analysis and evaluation of the design ideas, to inform choice as to the chosen design to take forward.
	2.3e Modification of design ideas to produce the chosen design, which meets the design brief and product specification.
	2.3f Use of calculations to determine all material quantities and technical details of materials, processes and components that could be interpreted by a third party.

#### What the NEA content requires students to do:

#### **2.3a Consideration of user group needs and preferences, of design ideas, conducting further research where necessary.**

Students should conduct additional research which supports the refinement of the chosen initial idea towards a final design suitable for prototyping. Refinements should be focused on the areas in which the initial design failed to meet or only partially met criteria within the specification (i.e. a design idea fails to meet 3-4 key specification criteria would require 3-4 potentially smaller and more focused pieces of research to support resolving these issues). A priority for research should be given to performance/ functionality criteria, and meeting the users' identified needs and wants, so that valid testing can be carried out with the final prototype.

#### **2.3b Consideration of the design as a whole, rather than focusing on component parts in isolation.**

Students are required to make refinements which support an improvement against the specification criteria, as outlined above. In making changes to parts of the initial design, it is anticipated that this will in turn improve the whole design and require an ongoing consideration for intended and unintended consequences of refinements. (e.g. by changing the material, the construction approach will also likely need to change).

# GCSE Design and Technology – NEA Guide

## **2.3c Modelling/simulation used to test the features of the design ideas.**

Students will gain credit for applying CAD, sketching, physical modelling and written evidence appropriately throughout development, which alongside 2.1 evidence, will inform the marks awarded for 2.4 Communication. If the student did not sketch any initial design ideas in 2.1, they must include sketches in 2.3 in order to avoid a negative impact on marks for 2.4 associated with graphical communication.

Physical modelling and/or application of CAD will support modifications that the student can identify as helping the design to meet specification criteria (i.e. not just modelling for the sake of modelling). Students can use modelling and CAD to generate calculations for materials, decide on processes, and choose between techniques to name some ideas. To support the making of a final prototype, the student may want to create any of the following:

- 3D visualisation.
- 2D plans, patterns or templates.
- Diagrams.
- Use of mathematics for calculations (such as surface area, volume, weight, length, etc).
- Engineering or working drawing.
- A cutting list/bill of materials
- CAD files for CAM.

## **2.3d Analysis and evaluation of the design ideas, to inform choice as to the chosen design to take forward.**

Students are required to communicate how they are developing their design idea towards a final design, through analysing their options and evaluating their choices as an ongoing activity. This should include making appropriate, purposeful judgements and decisions that improve the design towards meeting the specification, and may appear as annotation in this section.

## **2.3e Modification of design ideas to produce the chosen design, which meets the design brief and product specification.**

Students should present a “final design” within the evidence for development. The chosen design should be recognisable as:

1. Being a response to the contextual challenge and design brief.
2. Aiming to meet the specification criteria and the user wants/needs.
3. Be a design that appeared within the initial design ideas and has been improved through development.
4. A solution that has increasingly become more refined and improved against specification criteria, particularly those that were not met or only partially met.

## **2.3f Use of calculations to determine all material quantities and technical details of materials, processes, and components that could be interpreted by a third party.**

Students should be capable of developing a final design sufficient in detail and consideration so that another person with D&T knowledge such as a D&T teacher, can interpret the intentions for making. The student needs to communicate:

- The materials and their approximate quantities and measurements.

## GCSE Design and Technology – NEA Guide

- The intended processes to be used to shape and join those materials.
- The components made or bought in (off the shelf) that will be required to create the prototype.

This evidence supports a judgement of a students' capability within the D&T subject to plan the making of a prototype. Evidence does not need to be detailed beyond the need of a D&T teacher to attempt the manufacture themselves without instruction.

Level	Mark	2.3 Development of design ideas into a chosen design (AO1 4 marks, AO2 8 marks)
	0	No rewardable material.
<b>Level 1</b>	1–3	<ul style="list-style-type: none"> <li>• Limited use of research to inform ongoing developmental changes.</li> <li>• Basic refinements of design ideas and a design solution that partially meets the design specification, informed by the basic application of technical knowledge of materials and a limited application of modelling/simulation techniques.</li> <li>• Chosen design idea shows superficial technical details of some materials and components that could be interpreted by a third party.</li> </ul>
<b>Level 2</b>	4–6	<ul style="list-style-type: none"> <li>• Some appropriate use of research to inform ongoing developmental changes.</li> <li>• Some sound refinements of design ideas and a design solution that generally meets the requirements of the design specification, informed by the generally sound application of technical knowledge of materials and/or processes and the mostly appropriate application of modelling/simulation techniques.</li> <li>• Chosen design idea shows generally appropriate application of calculations to determine some material quantities and technical details of most materials and components that could be interpreted by a third party.</li> </ul>
<b>Level 3</b>	7–9	<ul style="list-style-type: none"> <li>• Generally appropriate use of research to inform ongoing developmental changes.</li> <li>• Generally sound refinements of design ideas and a design solution that mostly meets the requirements of the design specification, informed by the mostly sound application of technical knowledge of materials and processes and the fully appropriate application of modelling/simulation techniques.</li> <li>• Chosen design idea shows mostly appropriate application of calculations to determine most material quantities and technical details of materials, processes and components that could be interpreted by a third party.</li> </ul>
<b>Level 4</b>	10–12	<ul style="list-style-type: none"> <li>• Fully appropriate use of research to inform ongoing developmental changes.</li> <li>• Fully sound refinements of design ideas and a design solution that fully meets the requirements of the design specification, informed by the fully sound application of technical knowledge of materials and processes and the effective application of modelling/simulation techniques.</li> <li>• Chosen design idea shows fully appropriate application of calculations to determine all material quantities and technical details of materials, processes and components that could be interpreted by a third party.</li> </ul>

### How this assessment grid differentiates student evidence of development.

Development evidence is differentiated in two ways.

- The quality of the additional research and how it is used to change and improve the chosen design idea.

## GCSE Design and Technology – NEA Guide

- The increasingly technical refinement of the chosen design idea into a developed chosen design that; meets the user/client needs; and a third party with subject knowledge could make.

Higher level development work will:

1. Feature recognisable improvements that link to the new research.
2. Provide sufficient technical information for making a prototype.
3. Provide full details of a final solution that attempts to meet all of the specification criteria listed for 1.2 (including any potential revisions of the specification that may appear later in the portfolio).
4. Use an appropriate selection of different communication techniques (as assessed for 2.4).
5. Use increasingly specific and technical language, and show specific and technical details relating to materials, processes, and techniques, including how they are applied to the developed design.
6. Conclude with a distinct final design that has significantly improved from the chosen idea.

# GCSE Design and Technology – NEA Guide

## 2.4 Communication of design ideas (AO2 8 marks)

### Exemplars of 2.3 Communication of design ideas

Use [this live link](#) to view the latest exemplar materials for this assessment grid.

Stage	What students need to do:
<b>2.4 Communication of design ideas</b>	<p>2.4a Use a range of communication techniques and media to present the design ideas, including:</p> <ul style="list-style-type: none"><li>a freehand sketching (2D and/or 3D)</li><li>b annotated sketches</li><li>c cut and paste techniques</li><li>d digital photography/media</li><li>e 3D models</li><li>f isometric and oblique projection</li><li>g perspective drawing</li><li>h orthographic and exploded views</li><li>i assembly drawings</li><li>j system and schematic diagrams</li><li>k computer-aided design (CAD) and other specialist computer drawing programs.</li></ul> <p>2.4b Communicate the design ideas clearly and effectively using written techniques.</p>

**What the NEA content requires students to do:**

### **2.4a Use a range of communication techniques and media to present the design ideas.**

Students are encouraged to apply a range of different techniques throughout their design and development work. This will involve choosing appropriate techniques at different stages to demonstrate their understanding of how and when to use different communication techniques in the context of a D&T project.

It is important to note that only the communication of design ideas, both the initial design ideas and development of chosen design idea, will be credited for 2.4. This will require students to:

- Apply more than one graphical technique (to show appropriate application).
- Apply CAD within the design and/or development stages.
- Use writing to explain decisions, changes being made, ideas or to outline intentions.



# GCSE Design and Technology – NEA Guide

## 2.4b Communicate the design ideas clearly and effectively using written techniques.

Students are required to use written communication throughout their portfolio of work, though are welcome to use audio and video to complement this written element. Written work includes the breadth of potential written activities that a student may do, including work that is summative, analytical, or used to explain thinking, ideas, intentions, and planning.

Level	Mark	2.4 Communication of design ideas (AO2 8 marks)
	0	No rewardable material.
<b>Level 1</b>	1–3	<ul style="list-style-type: none"><li>• Basic selection and partially appropriate use of graphical techniques to communicate design ideas.</li><li>• Basic selection and partially appropriate use of computer-aided design (CAD) techniques to communicate design ideas.</li><li>• Basic selection and partially appropriate use of written techniques to communicate design ideas.</li></ul>
<b>Level 2</b>	4–6	<ul style="list-style-type: none"><li>• Relevant selection and generally appropriate use of graphical techniques to communicate design ideas.</li><li>• Relevant selection and generally appropriate use of computer-aided design (CAD) techniques to communicate design ideas.</li><li>• Relevant selection and generally appropriate use of written techniques to communicate design ideas.</li></ul>
<b>Level 3</b>	7–8	<ul style="list-style-type: none"><li>• Considered selection and fully appropriate use of techniques to communicate design ideas.</li><li>• Considered selection and fully appropriate use of computer-aided design (CAD) techniques to communicate design ideas.</li><li>• Considered selection and fully appropriate use of written techniques to communicate design ideas.</li></ul>

### How this assessment grid differentiates student evidence of communication.

2.4 Communication of design ideas will relate to two sections of the portfolio; 2.1 design of ideas; and 2.3 development of design ideas into a chosen design. These two bodies of evidence provide students with sufficient opportunity to demonstrate that they can:

1. Write effectively about their design ideas, and explain their thinking, decision making, and intentions relating to their design ideas.
2. Write using correct technical D&T language, which includes correct reference to materials, processes, and techniques. Students will be able to link each of these appropriately to design ideas. (i.e. parts designed to be formed by vacuum forming will feature the physical characteristics of the process)
3. Apply a graphical technique to communicate design ideas (e.g. 2D or 3D sketching).
4. Apply at least one further graphical technique which demonstrates they have an understanding of its purpose and application (e.g. cross section views, exploded views, thumbnails, magnified views, etc).
5. Apply Computer Aided Design (CAD) purposefully towards designing ideas.

### Important

There is no credit in this section for Computer Aided Manufacture (CAM), which is awarded in grids 3.1 and 3.2 to avoid double crediting work.

Spelling, Punctuation, and Grammar (SPAG) of the students writing should not influence the level decision for 2.4.

# GCSE Design and Technology – NEA Guide

## 2.5 Review of chosen design (AO3 6 marks)

### Exemplars of 2.5 Review of chosen design

Use [this live link](#) to view the latest exemplar materials for this assessment grid.

Stage	What students need to do:
<b>2.5 Review of chosen design</b>	2.5a Produce a chosen design solution for the product that meets the design brief and product specification.
	2.5b Consideration given to the materials, techniques and processes required to produce the chosen design solution.
	2.5c Incorporation of feedback from research into the chosen design.

### What the NEA content requires students to do:

#### **2.5a Produce a design solution for a product that meets the design brief and product specification.**

Students are required to analyse the chosen developed design idea against the list of specification criteria. Students will need to review the chosen design against all of the specification criteria, to confirm that they have:

1. Met the criteria which were previously partially met or not met at all.
2. Still met the criteria that were previously met, by checking for any adverse impact of developing the chosen design idea.

#### **2.5b Consideration given to the materials, techniques and processes required to produce the chosen design solution.**

Students are required to demonstrate consideration for the materials, processes and techniques that would be used to make the prototype. They can do this by considering material, process and technique options during the development of the chosen design.

#### **2.5c Incorporation of feedback from research into the chosen design.**

Students are expected to seek authentic feedback from the user/client or user group identified for their project, which as stated previously is best sourced from a real person (external to the school, or a school based peer/teacher acting as a real user or roleplaying as a user). This feedback can be used to support the validation of the chosen design, or during the development of the chosen design, and will build a strong justification for the chosen idea meeting the full list of specification criteria.

Artificially created feedback is not worthy of credit where the student writes their own feedback from a fictitious user.

## GCSE Design and Technology – NEA Guide

Level	Mark	2.5 Review of chosen design (AO3 6 marks)
	0	No rewardable material.
<b>Level 1</b>	1–2	<ul style="list-style-type: none"><li>• Superficial analysis of the refinements made to the chosen design in response to the contextual challenge, which considers a limited range of factors and makes partially appropriate connections between elements of the design.</li><li>• Basic evaluation of the refinements made to the chosen design, with limited reference to feedback made by others, and the consideration of the materials and components.</li></ul>
<b>Level 2</b>	3–4	<ul style="list-style-type: none"><li>• Generally developed analysis of the refinements made to the chosen design in response to the contextual challenge, which considers a generally relevant range of factors and makes mostly appropriate connections between elements of the design.</li><li>• Competent evaluation of the refinements made to the chosen design, with mostly sound reference to feedback made by others, and the consideration of the materials, components and manufacturing techniques.</li></ul>
<b>Level 3</b>	5–6	<ul style="list-style-type: none"><li>• Fully developed analysis of the refinements made to the chosen design in response to the contextual challenge, which considers fully appropriate factors and makes fully appropriate connections between elements of the design.</li><li>• Effective evaluation of the refinements made to the chosen design, supported by fully sound reference to feedback made by others and the consideration of the materials, components and manufacturing techniques.</li></ul>

### How this assessment grid differentiates student evidence of review of chosen design.

Review of chosen design evidence is differentiated by the quality of a student’s analysis of their chosen design against the specification criteria. This analysis should focus on:

- The refinements made to the initial design idea during development.
- The criteria that were originally met which might now inadvertently not be met following development.

With authentic engagement from a user/client or user group, students are able to validate their decisions through authentic feedback rather than just to self-validate the value of their refinements.

Students should validate specific material, process, and technique decisions at this stage in the portfolio (just prior to manufacturing). This will be evidenced by:

- Looking at the considerations of potential materials, processes, and techniques during the development.
- Detailing where specific and important choices were made.
- Changes to the design relating to technical factors that lead to related refinements.

To achieve suitable levels of analysis and communication of decisions, students (as previously referenced for review activities) will need to communicate these beyond the use of a limited referencing system (i.e. more than through a subjective “RAG” style system), which would fail to support communication of the students’ decision making process.

## 3- Manufacture

3.1a Manufacture – selection of materials (AO2 marks)

3.1b Manufacture – skills and processes (AO2 16 marks)

**Exemplars of 3.1a Manufacture – selection of materials**

Use [this live link](#) to view the latest exemplar materials for this assessment grid.

**Exemplars of 3.1b Manufacture – skills and processes**

Use [this live link](#) to view the latest exemplar materials for this assessment grid.

Stage	What students need to do:
<b>3.1 Manufacture</b>	<p>3.1a Production of a prototype that meets the requirements of the design brief and product specification, showing a wide range of making skills with precision and accuracy.</p> <p>3.1b Selection and application of:</p> <ul style="list-style-type: none"> <li>a material</li> <li>b range of tools, including marking-out tools, hand tools and machinery</li> <li>c range of techniques</li> <li>d fixtures, templates, jigs and/or patterns</li> <li>e components</li> <li>f surface treatments and finishes</li> </ul> <p>used in the manufacture of the prototype.</p> <p>3.1c Demonstration of safe working practice, for themselves and others.</p>

**What the NEA content requires students to do:**

**3.1a Production of a prototype that meets the requirements of the design brief and product specification, showing a wide range of making skills with precision and accuracy.**

Students are required to conclusively communicate how they intend to manufacture the prototype. The complexity of making skills exemplified, the precision and accuracy of the making achieved, and the demand of the overall make task, should be GCSE appropriate.

**3.1b Selection and application.**

Students are required to make and evidence decisions in relation to tools, equipment, and techniques and show their application when making the prototype. This includes decisions relating to fixtures, components, and the fittings which will be off the shelf parts.

# GCSE Design and Technology – NEA Guide

## 3.1c Demonstration of safe working practice.

Students are required to evidence their ability to carry out practical activity using safe working practices that account for both themselves and for others. Others will include other students and teachers in the workshop. This will be through photographic evidence as the most appropriate method to formulate and support a judgement.

Level	Mark	3.1a Manufacture – selection of materials (AO2 8 marks)
	0	No rewardable material.
<b>Level 1</b>	1–3	<ul style="list-style-type: none"><li>• Basic selection of materials that are generally appropriate for the chosen prototype.</li><li>• Show limited understanding of the material properties of the materials used in the prototype.</li></ul>
<b>Level 2</b>	4–6	<ul style="list-style-type: none"><li>• Considered selection of materials that are mostly appropriate for the chosen prototype.</li><li>• Show a generally sound understanding of material properties of the materials used in the prototype.</li></ul>
<b>Level 3</b>	7–8	<ul style="list-style-type: none"><li>• Effective selection of materials that are fully appropriate for the chosen prototype.</li><li>• Show a fully sound understanding of material properties of the materials used in the prototype.</li></ul>

### How this assessment grid differentiates student evidence of manufacture.

Selection of materials evidence differentiates based upon one page (depending on the complexity of the prototype being made) of independent materials selection information that is generated by the student (i.e. not copied from another source). This should account for:

1. All of the materials to be used for the prototype (not just those which form the majority of the making task) and their *material properties*.
2. Sufficient material information to source each *material stock form* prior to the manufacture.
3. An outline of the materials' *working properties* that justify their selection for the prototype.

Evidence of authentic material selection will/could already be in the development work (i.e. annotation exploring material, process and technique options) and complement this evidence. Generic material information duplicated from existing sources (textbooks, web sources, generative AI, etc) will receive no credit.

For guidance on generative AI, please refer to JCQ guidance using the following links:

[AI Use in Assessments: Protecting the Integrity of Qualifications](#)  
[Information for candidates Coursework assessments](#)

### Advice for scaled outcome projects.

If the student has committed to the manufacture of a scaled model as the prototype during the development, material selection evidence relating to the making of a scaled model will be evident in both the development evidence and selection of material evidence.

If the student has committed to the manufacture of a scaled model as the prototype after the development, material selection evidence relating to a scale model will only be evident in the selection of material evidence, with full scale materials considered in all previous evidence.

## GCSE Design and Technology – NEA Guide

Level	Mark	3.1b Manufacture – skills and processes (AO2 16 marks)
	0	No rewardable material.
<b>Level 1</b>	1–4	<ul style="list-style-type: none"> <li>• Produce a prototype that demonstrates basic making skills.</li> <li>• Basic selection of fixtures, components and fittings, which are generally appropriate for the chosen prototype.</li> <li>• Simplistic use of tools, equipment and techniques for the manufacture of the prototype.</li> <li>• Demonstrate an adequate degree of safe working practice for self and others.</li> </ul>
<b>Level 2</b>	5–8	<ul style="list-style-type: none"> <li>• Produce a prototype that demonstrates generally competent making skills.</li> <li>• Generally considered selection of fixtures, components and fittings, which are mostly appropriate for the chosen prototype.</li> <li>• Generally competent use of tools, equipment and techniques for the manufacture of the prototype.</li> <li>• Demonstrate a generally high degree of safe working practice for self and others.</li> </ul>
<b>Level 3</b>	9–12	<ul style="list-style-type: none"> <li>• Produce a prototype that demonstrates mostly competent making skills.</li> <li>• Mostly considered selection of fixtures, components and fittings, which are fully appropriate for the chosen prototype.</li> <li>• Mostly competent use of tools, equipment and techniques for the manufacture of the prototype.</li> <li>• Demonstrate a high degree of safe working practice for self and others.</li> </ul>
<b>Level 4</b>	13–16	<ul style="list-style-type: none"> <li>• Produce a prototype that demonstrates fully competent making skills.</li> <li>• Fully considered selection of fixtures, components and fittings, which are entirely appropriate for the chosen prototype.</li> <li>• Fully competent use of tools, equipment and techniques for the manufacture of the prototype.</li> <li>• Demonstrate a sustained high degree of safe working practice for self and others.</li> </ul>

### How this assessment grid differentiates student evidence of manufacture.

Skill and process evidence will require sufficient photographic or video evidence that shows all of the making that the student has carried out, to support a marking judgement for grid 3.1b during moderation. Students must make the chosen design they developed, as this will allow for testing against the specification. High level evidence will:

1. Include authentic photographic evidence of the skills and processes students are applying through the use of tools, equipment, and techniques to the making of the prototype (supported by annotation of what they are seeking credit for).
2. Include evidence of decision making around final choices for fixtures, components, and fittings in photographs (supported by annotation explaining the decision process).
3. Include evidence of accounting for safe working practice as consistently as possible throughout the stages of making (supported by annotation explaining the students actions and how these account for themselves and others in the workshop environment). A holistic

## GCSE Design and Technology – NEA Guide

judgement of photographic evidence should be taken in relation to awareness of safe working practice.

### **Important note:**

It is invalid to credit skills that are not shown through photographic evidence involving the student (if making by a teacher or technician has occurred, this should be acknowledged in the CAB).

### **Advice for scaled outcome projects.**

If the student has committed to the manufacture of a scaled model as the prototype after they have completed their development, review of development and materials selection, it is important that students take the following actions:

1. Ensure material, process, and technique choices are appropriate to scaled model making (i.e. materials with appropriate functional and aesthetic qualities to suit working to a much smaller set of measurements).
2. Ensure that scaled making remains sufficiently complex in level of demand, to avoid the limitations that scale “modelling” can have in relation to process and technique application.
3. Ensure there is the inclusion of an updated list of specification criteria, which relate to a scaled outcome and not a full-scale prototype. (The changes to the criteria will help the student carry out authentic testing by a user/client or user group in 4.1).
4. Ensure that the specification criteria re-written for a scaled outcome will permit suitably rigorous testing of aspects of performance and function of the prototype for evidence in 4.1.

# GCSE Design and Technology – NEA Guide

## 3.2 Quality and Accuracy (AO2 12 marks)

### Exemplars of 3.2 Manufacture – quality and accuracy

Use [this live link](#) to view the latest exemplar materials for this assessment grid.

Stage	What students need to do:
<b>3.2 Quality and accuracy</b>	3.2a Measuring the degree to which the prototype performs as intended.
	3.2b The prototype is accurately assembled and finished to a high quality.

**What the NEA content requires students to do:**

#### **3.2a Measuring the degree to which the prototype performs as intended**

Students are required to include photographic and/or video evidence sufficient to show that the prototype they have made:

1. Functions as intended (or does not).
2. Meets the needs of the user/client (or does not).
3. Solves the identified problem (or does not).
4. Meets the full list of specification criteria (or attempted to).

Students will do this effectively through their choice of media and the range of evidence they submit to showcase the final finished prototype in use. Prototypes which fail to “prove” their functionality will struggle to gain high credit.

#### **3.2b The prototype is accurately assembled and finished to a high quality.**

Students are required to include photographic and/or video evidence sufficient to build a judgement relating to accuracy, including:

1. The relationship between separate parts (how close they fit together, any gaps).
2. The finish of surfaces and edges of parts (how much the surfaces or edges are improved).
3. The measurements of parts against intended measurements (how accurate parts are in relation to tolerance).
4. The relationship between off the shelf parts and made parts (how well parts that are professionally made and bought in fit with those being made by the student).



## GCSE Design and Technology – NEA Guide

Level	Mark	3.2 Quality and accuracy (AO2 12 marks)
	0	No rewardable material.
<b>Level 1</b>	1–3	<ul style="list-style-type: none"><li>• Produce a simplistic prototype that partially meets the end user needs in relation to a basic design problem.</li><li>• Produce a prototype that meets limited aspects of the design specification.</li><li>• Show a basic understanding of the need for accuracy.</li></ul>
<b>Level 2</b>	4–6	<ul style="list-style-type: none"><li>• Produce a generally functioning prototype that adequately meets the end user needs in relation to a partially demanding design problem.</li><li>• Produce a prototype that meets some aspects of the design specification.</li><li>• Show a partially sound understanding of the need for accuracy.</li></ul>
<b>Level 3</b>	7–9	<ul style="list-style-type: none"><li>• Produce a mostly functioning prototype that mostly meets the end user needs in relation to a generally demanding design problem.</li><li>• Produce a prototype that mostly meets the design specification.</li><li>• Show a generally sound understanding of the need for accuracy.</li></ul>
<b>Level 4</b>	10–12	<ul style="list-style-type: none"><li>• Produce a fully functioning prototype that fully meets the end user needs in relation to a demanding design problem.</li><li>• Produce a prototype that fully meets the design specification.</li><li>• Show a fully sound understanding of the need for accuracy.</li></ul>

### How this assessment grid differentiates student evidence of quality and accuracy.

Quality and accuracy evidence will be found entirely from the photographic evidence of the chosen design being made into the final prototype. Students must provide sufficient evidence of the final prototype, which includes:

- views of all sides
- the prototype functioning using video where necessary (i.e. to capture movement or functions that cannot be captured through still images alone).

Prototypes will be judged on their appropriate level of demand for GCSE, which is a national standard set by all awarding organisations for the subject of D&T. Prototypes that sit above this national standard will not receive any extra credit due to higher than required levels of complexity, demand, quality, and accuracy. Similarly, prototypes which sit below this national standard will struggle to justify access to all quality and accuracy marks, if the made outcome is largely simplistic, undemanding, and not sufficiently challenging.

The quality of materials and availability of higher quality materials will not favour the judgement, to ensure that comparability between centres is acknowledged.

The use of Computer Aided Manufacture (CAM) will not favour the judgement for quality and accuracy, where it is unclear whether the student did or did not carry out the use of CAM independently. Students wishing to gain credit for CAM work will need to ensure the skilled use of CAM is documented in their evidence, through the photographic evidence and written annotation of these processes being student led.

## GCSE Design and Technology – NEA Guide

Any evidence of quality and accuracy in the design and development of design evidence (2.1 and 2.3), will not gain credit within grid 3.2. This will avoid double crediting work which has already gained credit in 2.1 and 2.3.

### **Advice for scaled outcome projects.**

It is required that scale models retain a focus on quality and accuracy, to avoid the made outcome being comparable to a model that would be suitable to appear in 2.3 development evidence.

Students can choose to make part of the chosen design to full scale, to prove a concept or test functionality of a specific part of the solution. Entirely scaled outcomes should:

1. Achieve a level of function.
2. Be made to a high standard with accurate measurements and tolerances of fit in assembly.
3. Use appropriate manufacturing techniques.

The use of craft type “model making” materials will potentially impact the judgement of quality and accuracy (e.g. using lolly pop sticks or similar materials that are not used for professional scaled outcomes).

## 4- Evaluate

### 4.1 Testing and Evaluation (AO3 6 marks)

#### Exemplars of 4.1 Testing and evaluation

Use [this live link](#) to view the latest exemplar materials for this assessment grid.

Stage	What students need to do:
<b>4.1 Testing and evaluation</b>	4.1a Analyse the prototype against the product specification by conducting a variety of tests under realistic conditions, to ensure fitness for purpose.
	4.1b Analyse the results of the prototype testing.
	4.1c Evaluate whether the prototype meets the product specification.
	4.1d Evaluate the sustainability of the final prototype by carrying out a life cycle assessment (LCA), in order to assess its impact on the environment.

#### What the NEA content requires students to do:

#### **4.1a Analyse the prototype against the product specification by conducting a variety of tests under realistic conditions, to ensure fitness for purpose.**

Students are required to test their final prototype with the user/client or user group. Each test will be focused on a measurable point from the specification and must include the performance criteria.

#### **4.1b Analyse the results of the prototype testing.**

Students are required to analyse how their prototype performed against the measurable specification points. This analysis should be a discussion about how each test did or did not validate the prototype.

#### **4.1c Evaluate whether the prototype meets the product specification.**

Students are required to critically judge if their prototype met, partially met, or did not meet each specification point. There is no loss of credit where a prototype fails to meet criteria but has attempted to.

#### **4.1d Evaluate the sustainability of the final prototype by carrying out a life cycle assessment (LCA) in order to assess its impact on the environment.**

Students are required to carry out an LCA based on their final made prototype. Prototypes specifically designed with sustainability criteria, will be able to reference to this in the LCA.

## GCSE Design and Technology – NEA Guide

Level	Mark	4.1 Testing and evaluation (AO3 6 marks)
	0	No rewardable material.
<b>Level 1</b>	1–2	<ul style="list-style-type: none"><li>• Superficial analysis of the prototype developed in response to the contextual challenge, taking into account the end user and product specification, and showing a partially considered approach to testing against measurable criteria.</li><li>• Basic evaluation of the prototype, taking into account the intended purpose of the prototype, including its sustainability through a life cycle analysis and drawing partially appropriate conclusions from testing against measurable criteria.</li></ul>
<b>Level 2</b>	3–4	<ul style="list-style-type: none"><li>• Generally developed analysis of the prototype developed in response to the contextual challenge, taking into account the end user and product specification, and showing a generally considered approach to testing against measurable criteria.</li><li>• Competent evaluation of the prototype, taking into account the intended purpose of the prototype, including its sustainability through a life cycle analysis and drawing generally appropriate conclusions from testing against measurable criteria.</li></ul>
<b>Level 3</b>	5–6	<ul style="list-style-type: none"><li>• Fully developed analysis of the prototype developed in response to the contextual challenge, taking into account the end user and product specification, and showing a fully considered approach to testing against measurable criteria.</li><li>• Effective evaluation of the prototype, taking into account the intended purpose of the prototype, including its sustainability through a life cycle analysis and drawing fully appropriate conclusions from testing against measurable criteria.</li></ul>

### How this assessment grid differentiates student evidence of testing and evaluation.

Testing and evaluation evidence will be differentiated by the following factors:

1. Has the student carried out and evidenced 3-4 valid tests against measurable criteria from their specification, including the criteria relating to performance?
2. Has the student carried out a full analysis against all of the specification criteria or not?
3. Has one or more real users been involved during testing and review work to confirm the suitability of the prototype?
4. Does the LCA consider technical factors such as impact of materials, processes, techniques, and assembly choices for the final prototype?

Audio or video evidence are best suited to capturing real time testing and review work engaged with a user and can support evidence relating to 3.2 Quality and Accuracy, where a judgement is made about the functionality of the final prototype.

Evidence relating to future improvements or modifications to the prototype is not a requirement therefore not credit worthy.

### Advice for scaled outcome projects.

Students should conduct an LCA in relation to their final made outcome, not for the full-sized outcome.