WJEC Eduqas GCSE (9-1) in DESIGN AND TECHNOLOGY
ACCREDITED BY OFQUAL

GUIDANCE FOR TEACHING

Teaching from 2017

This Ofqual regulated qualification is not available for candidates in maintained schools and colleges in Wales.
## Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>3</td>
</tr>
<tr>
<td>Continuing Professional Development</td>
<td>3</td>
</tr>
<tr>
<td>Aims and objectives</td>
<td>4</td>
</tr>
<tr>
<td>Prior learning and progression</td>
<td>4</td>
</tr>
<tr>
<td>The Specification at a glance</td>
<td>5</td>
</tr>
<tr>
<td>Course overview</td>
<td>8</td>
</tr>
<tr>
<td>Component 1 – Design and Technology in the 21st Century</td>
<td>8</td>
</tr>
<tr>
<td>Component 2 – Design and make task</td>
<td>20</td>
</tr>
<tr>
<td>Component 2 – Further examples of informal sketch pad and formal portfolio for the design and make</td>
<td>53</td>
</tr>
<tr>
<td>Further support and resources</td>
<td>87</td>
</tr>
<tr>
<td>Examinations and assessment</td>
<td>87</td>
</tr>
<tr>
<td>Suggested frameworks for delivery</td>
<td>91</td>
</tr>
<tr>
<td>Frequently asked questions</td>
<td>93</td>
</tr>
</tbody>
</table>
Introduction

The WJEC EDUQAS GCSE Design and Technology specification can be delivered and assessed in:

- all schools and colleges in England
- schools and colleges in independent regions such as Northern Ireland, Isle of Man and the Channel Islands
- independent schools in Wales.

It will be awarded for the first time in summer 2018, using grades 9 to 1.

This specification meets the Conditions and Requirements for GCSE Design and Technology Qualifications which set out the requirements for all new or revised GCSE specifications developed to be taught in England from September 2017. Additionally, the specification meets the requirements of the Approval Criteria for GCSE Design and Technology (July 2016). WJEC EDUQAS has worked closely with teachers and outside organisations in developing this qualification.

This guidance for teaching publication is one of a number of ways in which WJEC EDUQAS provides assistance to teachers delivering this specification. This guide is to be used in conjunction with, and as a supplement to the Specification and Sample Assessment Materials (question papers and marking schemes). It is not intended as, and cannot be used as, a replacement for either of these essential materials.

Other provision which you may find useful:

- easy access to the specification and other key documents on the WJEC EDUQAS website
- CPD advice available via the WJEC EDUQAS website
- face to face CPD at a range of venues
- additional, free-to-access, digital resources
- easy access, by telephone or email, to both the Subject Officer and Subject Support Officer for GCSE Design and Technology
- opportunities to become an examiner or moderator for the new specification
- visiting moderation

Contact points for WJEC EDUQAS in GCSE Design and Technology are as follows:

Stephen Howells  steve.howells@wjec.co.uk  029 2026 5017 (Subject Officer)
Candice Dempster  candice.dempster@wjec.co.uk  029 2026 5118 (Subject Support Officer)


Continuing Professional Development

CPD will be delivered to assist in explaining the WJEC EDUQAS GCSE in Design and Technology qualification. WJEC EDUQAS will continue to deliver CPD in England for the life of the qualification.

Please use the following link to search for CPD events and make bookings:

[http://www.wjec.co.uk/cpd/](http://www.wjec.co.uk/cpd/)
Aims and objectives

The WJEC EDUQAS GCSE specification in GCSE Design and Technology provides opportunities for learners to follow a course that is inspiring, rigorous, coherent and balanced.

The specification will enable learners to:

- demonstrate their understanding that all design and technological activity takes place within contexts that influence the outcomes of design practice
- develop realistic design proposals as a result of the exploration of design opportunities and users' needs, wants and values
- use imagination, experimentation and combine ideas when designing
- develop the skills to critique and refine their own ideas whilst designing and making
- communicate their design ideas and decisions using different media and techniques, as appropriate for different audiences at key points in their designing
- develop decision making skills, including the planning and organisation of time and resources when managing their own project work
- develop a broad knowledge of materials, components and technologies and practical skills to develop high quality, imaginative and functional prototypes
- be ambitious and open to explore and take design risks in order to stretch the development of design proposals, avoiding clichéd or stereotypical responses
- consider the costs, commercial viability and marketing of products
- demonstrate safe working practices in design and technology
- use key design and technology terminology including those related to: designing; innovation and communication; materials and technologies; making; manufacture and production; critiquing; values and ethics.

This specification also gives learners an opportunity to produce extended written responses and demonstrate the quality of their written communication, including appropriate use of punctuation and grammar.

The learners will also have the opportunity to produce an extended piece of design work based on contextual challenges where they will be expected to be creative, innovative and solve problems that they have realised themselves. They will be able to use the iterative design process in making real products that solve real problems identified by them.

www.eduqas.co.uk

Prior learning and progression

There are no previous learning requirements for this specification. Any requirements set for entry to a course based on this specification are at the school/college’s discretion.

This specification builds on subject content which is typically taught at key stage 3 and provides a suitable foundation for the study of design and technology at either AS or A level. In addition, the specification provides a coherent, satisfying and worthwhile course of study for learners who do not progress to further study in this subject.
The specification at a glance

The subject content for Design and Technology is basically split into two parts.

Technical Principles

<table>
<thead>
<tr>
<th>Core</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Core knowledge and understanding</strong> is presented in five clear and distinct topic areas:</td>
<td>Learners are required to study all of the content in these five areas, to ensure they have a broad knowledge and understanding of design and technology and that they are able to make effective choices in relation to which materials, components and systems to utilise within design and make activities.</td>
</tr>
<tr>
<td>- design and technology and our world</td>
<td></td>
</tr>
<tr>
<td>- smart materials</td>
<td></td>
</tr>
<tr>
<td>- electronic systems and programmable components</td>
<td></td>
</tr>
<tr>
<td>- mechanical components and devices</td>
<td></td>
</tr>
<tr>
<td>- materials</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>In-depth</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>In-depth knowledge and understanding</strong> is presented in six clear and distinct topic areas:</td>
<td>Learners are required to study at least one of these six areas, to ensure they have an in-depth knowledge and understanding of a specific material area and/or components and systems to support their design and make activities.</td>
</tr>
<tr>
<td>a. electronic systems, programmable components &amp; mechanical devices</td>
<td></td>
</tr>
<tr>
<td>b. papers &amp; boards</td>
<td></td>
</tr>
<tr>
<td>c. natural &amp; manufactured timber</td>
<td></td>
</tr>
<tr>
<td>d. ferrous &amp; non-ferrous metals</td>
<td></td>
</tr>
<tr>
<td>e. thermoforming &amp; thermosetting polymers</td>
<td></td>
</tr>
<tr>
<td>f. fibres &amp; textiles</td>
<td></td>
</tr>
</tbody>
</table>
Designing and making principles

<table>
<thead>
<tr>
<th>Core</th>
<th>Requirements</th>
</tr>
</thead>
</table>
| Core knowledge and understanding that learners are required to develop and apply is presented in ten clear topic areas:  
  - understanding design and technology practice  
  - understanding user needs  
  - writing a design brief and specifications  
  - investigating challenges  
  - developing ideas  
  - investigating the work of others  
  - using design strategies  
  - communicating ideas  
  - developing a prototype  
  - making decisions | Learners are required to cover all of the content in these ten areas, to ensure they are able to apply a broad knowledge and understanding of design and technology principles within design and make activities. |

<table>
<thead>
<tr>
<th>In-depth</th>
<th>Requirements</th>
</tr>
</thead>
</table>
| In-depth knowledge and understanding is presented in five clear topic areas:  
  - selecting and working with materials and components  
  - marking out  
  - using tools and equipment  
  - using specialist techniques  
  - using surface treatments and finishes | Learners are required to cover all of the content in these five areas, in relation to at least one of the topic areas (a to f) identified in the in-depth knowledge and understanding section of technical principles. |
### Technical principles

<table>
<thead>
<tr>
<th>Core knowledge &amp; understanding</th>
<th>In-depth knowledge &amp; understanding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design and technology and our world</td>
<td>a. Electronic systems, programmable components &amp; mechanical devices</td>
</tr>
<tr>
<td>Smart materials</td>
<td>b. Papers &amp; boards</td>
</tr>
<tr>
<td>Electronic systems and programmable components</td>
<td>c. Natural &amp; manufactured timber</td>
</tr>
<tr>
<td>Mechanical components and devices</td>
<td>d. Ferrous &amp; non-ferrous metals</td>
</tr>
<tr>
<td>Materials</td>
<td>e. Thermosetting &amp; thermoforming plastics</td>
</tr>
<tr>
<td></td>
<td>f. Fibres &amp; textiles</td>
</tr>
</tbody>
</table>

### Designing and making principles

<table>
<thead>
<tr>
<th>Core knowledge &amp; understanding</th>
<th>In-depth knowledge &amp; understanding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plus</td>
<td>(in relation to at least one of a to f above)</td>
</tr>
</tbody>
</table>
Course overview

GCSE Design and Technology

Component 1 – Design and Technology in the 21st Century

Written Examination: 2 hours
50% of qualification
100 marks in total
A mix of short answer structured and extended writing questions.

Learners are expected to attempt all questions in Section A and one from Section B. Learners will write their responses in the space provided underneath each question. The lined space provided is intended to give learners ample space to record their responses. There is no expectation that learners will fill up all the space provided. However, extra lined pages are provided within the question paper, and further continuation booklets will be provided for learners if necessary.
Sample core question

The Product Life Cycle Curve below shows the sales of a mobile telephone at each stage throughout its life cycle.

(a) (i) Underline what you believe to be the most appropriate unit of time for the graph. [1]

<table>
<thead>
<tr>
<th>Weeks</th>
<th>Months</th>
<th>Years</th>
</tr>
</thead>
</table>

Exemplar response: Months

*The only acceptable answer is Months.*

(ii) Describe what happens during the Introduction stage of a product. [2]

Exemplar response: The product is introduced into the market and the start of the sales is slow because people are not aware of the product.

*The answer is worth two marks as the learner explains what is happening and gives a detailed description.*
(iii) Give three examples for the decline in sales of a product.

Exemplar response: Technological advance - changes in taste and behaviour - economic circumstances

The question asks for three examples for the decline of sales. Each correct response will achieve 1 mark to a total of three.

(b) Recent energy legislation has meant that traditional light bulbs have been phased out and replaced by newer LED bulbs.

Traditional light bulb

LED bulb

(i) Explain why LED bulbs are now replacing the traditional light bulb.

Exemplar response: Traditional bulbs have short lifetimes; therefore there is a need to keep replacing them.

The question is specifically asking for an explanation, one mark has been awarded for a correct answer and one mark for a correct explanation.

(ii) Give a detailed reason why the energy legislation can be an advantage to the consumer.

Exemplar response: The consumer would gain because the life of the bulb is longer than a traditional one without any reduction in the quality of the light.

The question is specifically looking for a detailed reason. One mark would be awarded for the reason and one mark would be for an explanation or justification of the reason.
(iii) The table below shows the costs related to running each light bulb for an average day.

<table>
<thead>
<tr>
<th>Bulb Type</th>
<th>Power</th>
<th>Cost per day (Pence)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional light bulb</td>
<td>100W</td>
<td>6.97p</td>
</tr>
<tr>
<td>LED bulb</td>
<td>18W</td>
<td>1.26p</td>
</tr>
</tbody>
</table>

Calculate as a percentage the saving that will be made by using the LED bulb over the period of a year (365 days).
(Show all workings.)  
Exemplar response:

\[
6.97 \times 365 = £25.4405 \text{ (1 Mark)} \\
1.26 \times 365 = £4.599 \text{ (1 Mark)} \\
25.4405 - 4.599 = £20.8415 \text{ (1 Mark)}
\]

\[
\frac{20.8415}{25.4405} \times 100 = 81.9 \text{ saving} \text{ (1 Mark for indication of method but the answer may be wrong). Final answer must be either 81.9\% accept 82\% (1 mark)}
\]

This question is a typical mathematics style of question. The marks will be awarded for each correct stage or step in the calculations. The learner must ensure that they show all workings.

(c) (i) Explain one disadvantage of using wind power to produce energy.  

Exemplar response: Good wind locations are often located in rural areas and transmission lines need to be built to bring the energy to populated towns and cities.

The question is specifically looking for one disadvantage worth 2 marks. One mark will be awarded for a correct disadvantage and one mark for a more detailed description, explaining or illustrating the disadvantage when producing energy.
Discuss how using energy panels on houses can have a positive effect on the environment.

Exemplar response: The home owner has cheaper energy bills, saves money and even makes a profit from the panels by selling back to the electric company.

The answer must clearly indicate an understanding of how energy panels have a positive effect on the environment. We are then looking for some discussion from the learner to verify their understanding. If a learner submits a correct answer that is not in the marking scheme, the examiner can still award the marks appropriately.
Sample core question

The jacket pictured below has been made using a thermo-chromic smart material.

(a) Explain why a thermo-chromic material has been used as an additional design feature of the jacket. [3]

Exemplar response: When the user wears the jacket, their body temperature provides the heat to change the colour of the jacket; the action of a thermo-chromic material. This gives an additional aesthetic feature to the jacket that may attract a wider target market.

The explanation must show a clear understanding of a thermo-chromic material; its ability to change colour by the body temperature of the user. The answer then explains how the action of the material could be an aesthetic feature and attract a wider market.

(b) (i) Medium density fibreboard (MDF), glass reinforced plastic (GRP) and plywood are known as composite materials. Explain the meaning of a composite material. [2]

Exemplar response: A composite material is where two or more constituent materials with different properties or strengths are combined together to make one material. This often means composite materials have an improved weight to strength ratio.

This response demonstrates that the learner has a full understanding of a composite material, the points made are clearly explained including reference to strength to weight ratio.
(ii) The snowboarding helmet is made from a carbon fibre reinforced polymer. Analyse why the material properties of carbon fibre make it a particularly suitable material for the snowboarding helmet. [3]

Exemplar response: The carbon fibres have a very high tensile strength while also being very light and flexible. By combining the two materials together, you create a very light material that can be easily formed into the shape of the helmet, while also being extremely strong and resistant to breaking if a collision occurs.

The response indicates a detailed understanding of the main property of carbon fibre with a balanced reason for its use in the product.
Sample in depth question

**Fibres and textiles**

(a) Study the pictures of the two cushions shown below and answer the questions that follow.

![Floor cushion](image1.png)  
**Floor cushion**  

![Bolster cushion](image2.png)  
**Bolster cushion**

(i) State the name of the edge finish that has been used on both cushions and give a reason for its use.

Edge finish: **piping**  
Reason: The quality of the finished product looks more professional and strengthens the cushion.

*There is only one possible answer to the edge finish for 1 mark. In this case the answer for the reason the learner has put down two possible reasons for one mark ie the quality and strengthens the cushion. One detailed reason would also gain one mark.*

(ii) The main material used for both cushions is woven cotton. Give one reason why a material with a woven construction is the most suitable choice for these products.

The woven material is more stable and will help give structure to the cushions.

*The learner has given a correct answer and with a justified reason. In this question reference to cotton in the answer is not needed.*
(iii) Explain why it is important to lay templates out following pattern language in the construction of the two cushions. [2]

Pattern language gives guidance on how the templates should be laid on the material and how the pieces will fit together when making the cushions. Failure to follow pattern language can affect the quality of the final products as the pieces may not fit together as intended.

The question is asking for an explanation of pattern language and its importance. Within the body of the answer the learner shows an understanding because they make reference to 'guidance' and the importance it plays in ensuring all the pieces are joined precisely for a high quality outcome.

(iv) The pink flower design shown below needs to be appliquéd onto the bolster cushion to co-ordinate the two cushions.

Describe how you would appliquéd the flower design onto the bolster cushion. [4]

Strengthen the top piece of material (in this case the patterned flower shape) with bondaweb by ironing it to the back of the flower.

Cut it out carefully following the shape of the flower.

Peel off backing paper on the bondaweb and place it on the second material (green background in this case).

Iron the shape in place.

Stitch around the edge to secure it to the green material.

Appliqué can be done in a number of different ways, but all follow a logical sequence. The top material (flower shape in this case) has to have a method of stabilising the material prior to stitching. Any acceptable method would be marked. Within the body of the answer to the above question there must be a description and up to four different processes. In this case the learner has given five correct stages but he or she would only achieve 4 marks.
(b) The finished diameter of the circular ends on the bolster cushion is 20cm as shown below.

![Circular end panel with a finished diameter of 20cm]

Calculate what the circumference of the circular template would need to be in order to achieve the finished measurement (a seam allowance of 1.5cm will need to be included in your calculation), and how many cylindrical sides of the bolster cushion can be cut from a 5m length of fabric. (Show all workings.)

**NB.** The length of the bolster cushion is the same measurement as the width of material.

Diameter plus seam allowance: \(20\text{cm} + 3\text{cm} = 23\text{cm}\) (1)

\[3.142 \times 23\text{cm} = 72.3\text{cm}\] (1)

(Credit method based on: Radius plus seam allowance \(10 + 1.5\text{cm}\) (1))

The learner needs to recognise that the seam allowance – standard measurement is 1.5cm - will need to be added twice to the diameter to get the full diameter for one mark to be awarded. This need to be multiplied by \(\pi\) \((3.142)\) for another mark and the correct answer will get the final mark.

5m length of fabric / 62.84 cm circumference (circumference does not include seam allowance) (1)

7 lengths (round down from 7.956) (1)

The circumference is calculated again this time without seam allowances for one mark, which gives the length of the rectangular piece that will form the cylindrical side. This measurement will need to be divided into 5m for the number of pieces. The correct answer will need to be rounded down for the second mark.

It is essential that the learner clearly shows all the processes/steps involved. Any correct mathematical approach to the calculations will be acceptable. Marks will be awarded for steps within the mathematical process. Learners will be allowed to use calculators in the examination but a calculator will not be of any use if the learner does not realise that units may be different; as in this case where the units are centimetres and metres. Credit will be given to any appropriate approach in calculating the circumference and the number of cylindrical sides that can be cut from the fabric.
(c) The cushions are to be sold under the fair trade logo. Analyse the impact on communities and workers who benefit under this scheme. [5]

**Indicative content**

This content is not prescriptive and candidates are not expected to refer to all the material identified below

- Fair Trade Foundation seeks to ensure greater equity in international trade, so workers should get paid a fair wage
- companies have better access to markets in developed countries, so workers can have better job security
- income means that there may be a reduction in poverty and improved education for children within communities
- it helps support employment and raising the standards of living in third world countries
- it can encourage the development of skills in third world countries
- the working conditions within third world suppliers can be improved by securing orders via the Fair Trade scheme/less exploitation of workers
- it can help small businesses in third world countries to move from income insecurity and poverty to economic self-sufficiency and ownership.

The above list is indicative content that learners could refer to within their answer. Credit would be given to alternative answers not listed but are considered appropriate. Within the answer learners will need to demonstrate an understanding of the term ‘analyse.’ It is expected that learners will apply reasoning to any of the statements they make. Band descriptions will be applied to questions with extended answers.

<table>
<thead>
<tr>
<th>AO3 2a 5 marks</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BAND 3</strong></td>
<td>4-5</td>
</tr>
<tr>
<td>A coherent answer demonstrating detailed, relevant knowledge and understanding, to analyse the impact on communities and workers who benefit under the fair trade scheme. There will be evidence of relevant examples and a well-developed logical chain of reasoning, sustained throughout.</td>
<td></td>
</tr>
<tr>
<td><strong>BAND 2</strong></td>
<td>2-3</td>
</tr>
<tr>
<td>Answer has some coherence, demonstrating partial knowledge and understanding, to analyse the impact on communities and workers who benefit under the fair trade scheme. There will be some evidence of mostly relevant examples and a logical chain of reasoning, but this may not be sustained throughout.</td>
<td></td>
</tr>
<tr>
<td><strong>BAND 1</strong></td>
<td>1</td>
</tr>
<tr>
<td>Answer demonstrates only basic knowledge and understanding, to analyse the impact on communities and workers who benefit under the fair trade scheme. There will be limited evidence of relevant examples or a logical chain of reasoning.</td>
<td></td>
</tr>
</tbody>
</table>

Award 0 marks for incorrect or irrelevant answers.
It is important that designers consider the world we live in and the needs of future generations. Evaluate how designers can lessen the impact on our environment when designing new textile products. [6]

**Indicative content**

This content is not prescriptive and candidates are not expected to refer to all the material identified below.

Designers can lessen the impact on our environment when designing textile products by:

- considering how to minimise waste in manufacture of textile products;
- for the product in question, considering whether using natural or synthetic textiles will have the least impact on the environment (response could also refer to sustainability);
- considering the use of natural finishes/dyes where appropriate;
- if the product contains materials in addition to textiles, ensuring as far as possible that it is straightforward to separate the textile components from any other materials at the end of the product's life, to encourage recycling;
- reducing the need for unnecessary packaging of the product;
- considering renewable energy sources during manufacture;
- designing textile products to have a long life so that replacements should not be needed for some time (recognising that fashion/fads can impact here).

Credit would be given to alternative answers not listed but are considered appropriate. Within the answer learners will need to demonstrate an understanding of the term 'evaluate.' It is expected that learners will show evidence of appraising a situation and/or make judgements relating to any facts they include within their answer.

**Band descriptions will be applied to questions with extended answers.**

<table>
<thead>
<tr>
<th>Band</th>
<th>Description</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Band 3</td>
<td>A coherent answer demonstrating detailed, relevant knowledge and understanding, to evaluate how designers can lessen the impact on the environment when designing textile products. There will be evidence of relevant examples and well-developed substantiated judgements in a response which is logically structured.</td>
<td>5-6</td>
</tr>
<tr>
<td>Band 2</td>
<td>Answer has some coherence, demonstrating partial knowledge and understanding, to evaluate how designers can lessen the impact on the environment when designing textile products. There will be some evidence of mostly relevant examples and partly-substantiated judgements in a response which is generally well structured.</td>
<td>3-4</td>
</tr>
<tr>
<td>Band 1</td>
<td>Answer demonstrates only basic knowledge and understanding, to evaluate how designers can lessen the impact on the environment when designing textile products. There will be limited evidence of relevant examples or judgements in a response which demonstrates little structure.</td>
<td>1-2</td>
</tr>
</tbody>
</table>

Award 0 marks for incorrect or irrelevant answers.
Component 2 – Design and make task

NEA (Non Examined Assessment) – 50% of the qualification
Approximately 35 hours
Design and make task from a contextual challenge set by WJEC EDUQAS
Worth 100 raw marks
Apply the iterative process of designing

Contextual Challenge

The contextual challenge requires learners to demonstrate, at GCSE level, their knowledge and understanding of the following core designing and making principles, in the context of a sustained design and make activity.

- work within a context which will inform the outcome
- identify and understand client and user needs
- write a design brief and specification
- identify opportunities and constraints that influence the processes of designing and making
- explore, develop, test, critically analyse and evaluate ideas
- investigate and analyse the work of others
- use different design strategies to generate initial ideas
- develop, communicate, record and justify design ideas
- design and develop at least one prototype* that is fit for purpose
- make informed and reasoned decisions to identify the potential for further development

In addition, when designing and making in relation to at least one material or component/system(s) learners are required to:

- select and work with appropriate materials and components to produce a prototype
- use appropriate and accurate marking out methods; work within tolerances; understand efficient cutting and minimise waste
- use specialist tools and equipment, appropriate to the materials or components used, to create a specific outcome
- use specialist techniques and processes to shape, fabricate, construct and assemble a high quality prototype, as appropriate to the materials and/or components being used
- use appropriate surface treatments and finishes

*In the context of this component, ‘prototype’ is used to describe all working solutions including products, models and systems.
**NEA:** A sustained design and make task, based on a contextual challenge set by WJEC EDUQAS, assessing learners’ ability to apply the iterative approach to:

- Identify, investigate, analyse and outline design possibilities
- Design and make prototypes and evaluate their fitness for purpose.

Marked and standardised internally and moderated by a visiting moderator.

**Requirements**

Three contextual challenges available June 1st in the year preceding the year in which the qualification is awarded. Learners will choose to tackle **one** challenge. From the challenge the learner will investigate and decide upon possible problems/issues before deciding on a possible design task to tackle.

There will be NO SET PAGE FORMAT for the NEA.

**Suggested structure of evidence required**

**Informal A4/A3 sketchbook**

*This will clearly:*

- Identify design possibilities
- Generate and develop design ideas.

**Note:** Centres do not need to purchase an A4/A3 sketchbook and this does not have to be a bound book. It could simply be a series of A3 pages stapled together, or it could be a series of A3 and A4 pages loosely bound together with a treasury tag for example. How exactly the work is presented is up to the individual centre. However, it is important to track the work and record clearly where marks have been awarded against the marking criteria.

**Formal presentation A3 portfolio to include evidence of:**

- Final brief and specification
- Final prototype – pictorial details
- Final prototype – technical details
- Final prototype – production details
- Sequence of production
- Evaluation of final prototype
- Modifications and further developments
- Photographs of final prototype

**Make/practical outcomes**

*Final prototype (fully functioning high quality product) any supporting practical pieces including models, jigs, formers, patterns, tests, trials, iterations must be included.*
Assessment criteria for the design and make contextual challenge.

**Note:** You do need to clearly indicate the learner’s name and the centre name and number.

<table>
<thead>
<tr>
<th>Assessment Criteria</th>
<th>Marks</th>
<th>Assessment objective</th>
<th>Guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Identifying and investigating design possibilities.</td>
<td>10</td>
<td>AO 1</td>
<td>• The design context must be analysed critically</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• There will be a number of possible design tasks identified</td>
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<td></td>
<td></td>
<td></td>
<td>• Detailed and relevant research will be evident</td>
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<td></td>
<td></td>
<td></td>
<td>• Consider the users</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Analysis of existing products</td>
</tr>
<tr>
<td>(b) Developing a design brief and specification.</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(c) Generating and developing design ideas.</td>
<td>30</td>
<td>AO 2</td>
<td></td>
</tr>
<tr>
<td>(d) Manufacturing a prototype.</td>
<td>30</td>
<td></td>
<td></td>
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<tr>
<td>(e) Analysing and evaluating design decisions and prototypes.</td>
<td>20</td>
<td>AO 3</td>
<td></td>
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<tr>
<td>Total</td>
<td>100</td>
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</tbody>
</table>
A brainstorm might be the starting point for some learners to gather their thoughts about the context. It is a good opportunity to explore the divergent possibilities within the context, and also generate important areas for further investigation/research. Mind maps or brainstorms can allow learners to record potential ideas, questions, and tasks that can be extended at a later date, developed further during the iterative design process, or parked and not revisited.
Evidence of critical analysis of users' needs and wants, with investigation into the problem. Target market is considered and the problem is understood fully.
Both pages show research into existing products, with the evaluation of features of existing designs on the market. All of the research is focussed and relevant. There is analysis of information rather than just the presentation of information. Learners are reminded that their evaluation and analysis of the research is the most important factor, not simply presenting raw research results.
Disassembling a product helps a learner see how typically similar products are manufactured and assembled.
Where appropriate, the opportunity to look at other designers, manufacturers, design movements and practitioners can often bring inspiration and stimulate styles, colours, forms and textures. This research is then used to inspire learners’ own designing.
Band 4 Assessment Criteria - Identifying design possibilities

- Undertaken thorough and effective identification of opportunities for the development of designs within the prescribed context.
- Undertaken detailed, relevant research and investigation, clearly linked to the context and, where appropriate, the work of past/present professionals and companies.
- Undertaken detailed and effective analysis of information, reflecting the needs, wants and values of clients or potential users.
- Identified a broad range of problems/opportunities to clearly inform the development of possible design briefs.

Learners meeting the four descriptors from Band 4 of the marking criteria deserve 9-10 marks.

<table>
<thead>
<tr>
<th>Assessment Criteria</th>
<th>Marks</th>
<th>Assessment objective</th>
<th>Guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Identifying and investigating design possibilities.</td>
<td>10</td>
<td>AO 1</td>
<td>• Opportunities are carefully considered before final brief</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Understand the task and the needs and wants of users</td>
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<td></td>
<td></td>
<td></td>
<td>• A clearly defined design brief is evident</td>
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<td></td>
<td></td>
<td></td>
<td>• A detailed specification is generated to drive designing</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Measurable criteria included</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• The specification is used throughout the designing process</td>
</tr>
<tr>
<td>(b) Developing a design brief and specification.</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(c) Generating and developing design ideas.</td>
<td>30</td>
<td>AO 2</td>
<td></td>
</tr>
<tr>
<td>(d) Manufacturing a prototype.</td>
<td>30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(e) Analysing and evaluating design decisions and prototypes.</td>
<td>20</td>
<td>AO 3</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td></td>
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</table>
A clear final brief is presented as a result of the detailed, relevant and focussed research, following the consideration of a number of possible design tasks.

This is a detailed specification containing measurable criteria that will be used to drive designing and development. The specification must be used as a design tool, and any ideas, models, tests, initial prototypes must be evaluated against the specification criteria. There are important features used as headings with multiple statements within each heading to ‘split’ up the success criteria into manageable aspects. There is a hierarchy of importance and the learner has split the criteria into Primary and Secondary which clarifies what must be included and what could be included in the final proposal.
This specification is slightly weaker than the previous example. The criteria are less developed. The statements do not include such specific details, and therefore it will be more difficult to begin iterative designing because the content has not been pinpointed clearly. Using ‘….must be brightly coloured…’ is not specific. There are many bright colours, learners need to name 'lime green' if that is what the needs and wants of the users require. Avoiding basic and simplistic statements is crucial, often small, safe, cheap, aesthetically pleasing are often included in specification criteria, but these terms offer no meaning in isolation. Sizes need to be in measurable data form, e.g. 250mm x 120mm x 30mm. Cost must include prices in numerical values e.g. must cost no more than £12.00 to manufacture in a school workshop, and the end product must have a retail price of £18.99. The development of specification criteria is critical, and will make designing, prototyping, testing and evaluating far easier to conduct.
Band 4 Assessment Criteria - Developing a design brief and specification

- Fully considered a range of problems/opportunities before deciding upon a final design brief.
- Demonstrated a very good understanding of the task ahead and the requirements which have to be met, to satisfy fully the needs, wants and interests of potential users.
- Written a design brief, relevant to the context, based upon a thorough analysis of their research and investigation.
- Written a detailed, relevant specification, including a range of objective and measurable criteria, to direct and inform the design and manufacture of a prototype.

A learner who meets the descriptors above deserves to be awarded 9-10 marks in Band 4.
<table>
<thead>
<tr>
<th>Assessment Criteria</th>
<th>Marks</th>
<th>Assessment objective</th>
<th>Guidance</th>
</tr>
</thead>
</table>
| (a) | Identifying and investigating design possibilities. | 10 | AO 1 | • 30% of the NEA  
• An iterative approach is required  
• A range of design strategies  
• Clear and effective testing  
• Analysis against specification identifies further refinements  
• Testing and selection of:  
  - Materials  
  - Components  
  - Dimensions  
  - Manufacturing/production  
  - Finishing  
• High level skills evident |
| (b) | Developing a design brief and specification. | 10 | | |
| (c) | Generating and developing design ideas. | 30 | AO 2 | |
| (d) | Manufacturing a prototype. | 30 | | |
| (e) | Analysing and evaluating design decisions and prototypes. | 20 | AO 3 | |
| Total | | 100 | | |

This aspect of the NEA represents a large proportion of the overall mark allocation, and there will need to be a variety of types of evidence to achieve high marks here. The iterative approach must allow learners to ‘unpick’ the problem and begin to come up with possible ideas for parts of the potential solution. There must be a clear ‘think, create, test, evaluate’ cyclic approach to the activities that learners undertake as part of their generating and developing of design ideas. This culminates in the presentation of the final prototype.
A learner could start with some initial ideas for the outcome. This might be an opportunity to think about the problem and possible solution as a 'whole'.

33
Once a learner has an idea that has potential, it requires testing. Here the learner explores form, aesthetics and size issues in order to establish a further understanding of the casing issues as part of the engineering design product. There are multiple models in card, foam and HIPS which are fully evaluated against specification criteria. Refinements are made as a result of analysis, and further iterations are produced and tested. The introduction of CAD is useful here and supports the modelling, testing, analysing and refining of possible ideas.
The function of the device is being developed here. Again in an iterative style, the learner designs, models, evaluates and improves a number of possible flowcharts to control a PICAXE system for the nightlight. The learner has used a prototype pcb to run different iterations of the flowchart to test whether the device functions as specified in the specification. Detailed commentary supports decision making.
Here the learner uses CAD to develop a PCB for the PICAXE system. There are several iterations showing how the PCB is developing, analysis and decision making is evident. Analysis shows how the former will be constructed for the vacuum forming process. There are details of the base, with holes included to ensure the air is removed and the shell fits the base accurately.
This page focusses on the construction of the product, the components required and possible costs. Size issues are considered, decisions made are clearly referenced.
This page concentrates on construction of the shell, and how components fit together when assembled. Fine details such as battery pack holders, holes for screws, and keyhole fittings are finalised. Speaker holes are included, alongside CAMM1 vinyl details for finishing. Again, there is comprehensive analysis and decision making evident, with detailed annotation of all design decisions.

Within the NEA the learner may interpret the contextual challenges and decide to do a different form of project which may focus on different content.
Initial design sketches for a mechanical toy money box. When a coin is placed inside the money box, the device moves forwards, with the head oscillating.
Further mechanical designs for the possible movement of the tortoise’s head. Pulley systems, crank and sliders and cam and follower mechanisms suggested, with detailed annotation and high quality sketching.

The electro-mechanical device is being developed from ‘inside out’ which is an effective style of iterative designing for products with internal control systems.

Battery positions, pcbs, pivot points/levers, external input components all being configured.
Finalising the individual component parts for the moving money box. The vacuum formed shell provides space for internal electronic components and mechanical parts to achieve the desired function.
This example shows final technical details of a proposal, with all CAD CAM data, power and speed settings, and CAMM1 vinyl detailing.

The final transparency for PCB manufacture is presented, along with the final flowchart to program the pcb.
This is the final pictorial presentation of the prototype to be manufactured. A good attempt at generating a 3D drawing of a complex product. The exploded diagram offers details of how components are assembled, and how electronic devices are attached to the casing of the prototype.
A manufacturing specification page provides evidence of specific specialist tools, equipment and processing that will be used to manufacture the product.
Band 4 Assessment Criteria — Generating and Developing Ideas

- Considered a range of design strategies, techniques and approaches and applied an iterative design process to generate and communicate a broad, complex and diverse range of initial ideas.
- Identified and considered social, moral and economic factors which are relevant to the context and potential user(s).
- Clear, effective and detailed use of testing to evolve ideas and to refine their design decisions.
- Developed a detailed proposal, including comprehensive and relevant details of materials, dimensions, finishes and production techniques, which clearly address all requirements of the design brief and specification.
- Demonstrated sophisticated use of a range of skills/techniques to clearly communicate ideas and proposals to a third party.

A learner meeting this assessment descriptor deserves 24-30 marks.

<table>
<thead>
<tr>
<th>Assessment Criteria</th>
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</tr>
</thead>
<tbody>
<tr>
<td>(a) Identifying and investigating design</td>
<td>10</td>
<td>AO 1</td>
<td>• 30% of the NEA</td>
</tr>
<tr>
<td>possibilities.</td>
<td></td>
<td></td>
<td>• Stages of production timeline</td>
</tr>
<tr>
<td>(b) Developing a design brief and</td>
<td>10</td>
<td></td>
<td>• Completed prototype to schedule</td>
</tr>
<tr>
<td>specification.</td>
<td></td>
<td></td>
<td>• Successful high level making skills</td>
</tr>
<tr>
<td>(c) Generating and developing design</td>
<td>30</td>
<td>AO 2</td>
<td>• Excellent appreciation of materials and components</td>
</tr>
<tr>
<td>ideas.</td>
<td></td>
<td></td>
<td>• High levels of accuracy in outcome</td>
</tr>
<tr>
<td>(d) Manufacturing a prototype.</td>
<td>30</td>
<td></td>
<td>• Prototype functions perfectly</td>
</tr>
<tr>
<td>(e) Analysing and evaluating design</td>
<td>20</td>
<td>AO 3</td>
<td>• Meeting the user needs and wants</td>
</tr>
<tr>
<td>decisions and prototypes.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
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</tbody>
</table>
A sequence of stages for the production of the prototype is presented. The stages need to include details about the materials, processes, tools and equipment that will be used at each stage when making the prototype. Factors such as quality control are good indicators that learners are mindful of the necessity for a high quality final prototype.
The final prototype is a neatly constructed vacuum formed HIPS shell. The learner has used a wood turning lathe to create the former from layered mdf. There is a laser cut acrylic base so that the HIPS shell fits perfectly and tightly. The bottom layer of acrylic has again been laser cut, with CAMM 1 vinyl used to create two eyes for the ladybird. Inside, the pcb is of a very high quality. It has been developed accurately and constructed well with high level skills. There are no burn marks or defects. There is a battery pack holder which has been cut from a HIPS sheet, heated using a line bender, and set at the desired angle. There are three LEDs equally spaced and neatly positioned using a pillar drill to create the holes, with LED holders mounting the LEDs in place. There is a series of holes drilled with a pcb drill to act as a speaker vent. The on/off toggle switch is located at the back of the product. The LDR is mounted onto the surface of the ladybird and each leg fits through a small pcb drilled hole. CAMM 1 vinyl spots are used to create the spots for the ladybird. The device is fully programmed, works perfectly, to complete a high quality pre-production prototype.
Band 4 Assessment Criteria – Manufacturing a prototype

- Clearly communicated comprehensive and relevant details of a logical sequence and achievable timeline for the stages of production and testing of their final prototype.
- Selected and worked with appropriate materials and components to successfully complete the manufacture of their prototype to a defined schedule.
- Used a range of appropriate making skills and processes to produce a high quality functioning prototype that meets the requirements of the design specification and is fit for purpose.
- An excellent understanding of the working properties and performance characteristics of the specified materials and, where appropriate, demonstrated consideration of surface treatments/finishes.
- Selected and safely used specialist tools, appropriate techniques, processes, equipment and machinery with a high level of accuracy and precision to enable the prototype to perform as intended and fully meet the user’s requirements.

This learner is clearly demonstrating skills within the 24 – 30 mark descriptor.

<table>
<thead>
<tr>
<th>Assessment Criteria</th>
<th>Marks</th>
<th>Assessment objective</th>
<th>Guidance</th>
</tr>
</thead>
</table>
| (a) Identifying and investigating design possibilities. | 10 | AO 1 | - 20 marks available  
- On-going evaluation and analysis of ideas as they develop  
- Appraising concepts through the iterative process  
- A critical analysis and evaluation of the FINAL prototype  
- User trials/testing and opinions of potential users  
- Reflection on feedback and further development issues identified  
- Detailed suggestions for modifications |
| (b) Developing a design brief and specification. | 10 | | |
| (c) Generating and developing design ideas. | 30 | AO 2 | |
| (d) Manufacturing a prototype. | 30 | | |
| (e) **Analysing and evaluating design decisions and prototypes.** | 20 | AO 3 | |
| Total | 100 | | |
There are evaluative comments running throughout the iterative development of the proposals. The final analysis is clearly linked to the brief and specification, and critical and perceptive comments are evident. Opinions are sought from others, but there is little evidence of this. The learner would benefit from constructing a live user trial, with photographic/video evidence of the testing, together with the thoughts, opinions and comments of those users.
There is some evidence of reflection on feedback here, where this learner offers further modifications. This needs to be a designing/sketching based activity where learners do not simply point out faults, but offers solutions and further refinements which would develop the final prototype further.
Band 4 Assessment Criteria - Analysing and evaluating design decisions and prototypes.

- Undertaken a critical, objective analysis, evaluation and testing of their ideas and decisions whilst applying iterative design processes.
- Undertaken a critical and objective evaluation and testing of their final prototype, taking into account the views of potential users.
- Responded to feedback and clearly identified the potential for further development of their prototype, with detailed suggestions for how modifications could be made.

The learner does not quite meet all of the descriptors here, so cannot be awarded the Band 4 level 16 – 20 marks. The learner deserves a Band 3 mark, which fits between 11 – 15 marks. There is some reference to users and testing, but due to the lack of evidence, and depth of analysis, 13 marks would be a fair reflection.

Summary of what is required for the iterative design and make task

<table>
<thead>
<tr>
<th>Informal A4/A3 sketchbook</th>
<th>Formal presentation A3 portfolio</th>
<th>Final prototype (fully functioning high quality product)</th>
</tr>
</thead>
</table>

Exemplar pages can be found on the WJEC EDUQAS website:

http://www.eduqas.co.uk/qualifications/design-and-technology/gcse/

Design iteration

Definition: A design method based on the process of prototyping, testing, analysing, and refining a product or process. It is not a method that will follow the traditional linear path to create a desired outcome but a cyclic one.
The following links are available for you to watch to support and develop your understanding of the iterative process.

- https://www.youtube.com/watch?v=16rGwTX4NcM
- https://www.youtube.com/watch?v=WcFSZGvXtjA

Teacher guidance during the design and make

You are allowed to guide/support the learner through the iterative process. The subject teacher should check that the learner selects a problem that is appropriately challenging and provides the opportunity to address all the assessment criteria. For further details on teacher guidance please refer to pages 38 – 41 of the specification.
Component 2 – Further examples of informal sketch pad and formal portfolio for the design and make

Identifying and investigating design possibilities.

Some learners find mind maps a useful means of gathering their initial thoughts and ideas and to identify key points for further consideration. It provides an excellent means of exploring the divergent range of possibilities within the chosen context.
Focussing on users

Relevant research/product analysis

A range of possible design briefs
**Design Brief:** Using the concept of the 6R’s design and make a garment out of recycled materials and components for the teenage market. The product can be casual but fashionable, it could be versatile. The garment could raise awareness of the millions of tonnes of textiles thrown away each year and how to recycle your old materials.

The final design brief is clear and detailed formed as a result of focussed and relevant research. It offers numerous opportunities for a range of possible design ideas. The Specification is reasonably detailed and includes some measurable criteria. User needs and wants have been identified alongside some factors critical to success. Identifies key aspects including: form, function, materials, sizes, safety, ergonomics, cost etc.
Generating and developing design ideas: Informal sketch pad

A range of initial ideas that meet the design specification and brief – a good starting point. Ideas need to be evaluated and some will be rejected. First iteration for example could focus on form, shape and style. First toile: evidence of modelling could be considered at this point.
Any starting point!

Another iteration focusing on style details:

Quick developmental sketches with high levels of appropriate annotation.

On-going evaluation of ideas with lots of ideas rejected.

Practical testing of ideas is essential.

Decision making will support developmental iterations.
Good evidence of modelling the ideas:
Consider a mix of practical activity, sketching, CAD/CAM.
Analysis should be perceptive, with thorough testing against the specification.
Lean design: focussing on the most important details!
Another iteration focusing on functional development:

Practical testing of processes for the construction of the product. Quick sketches and alternative methods need to be considered.

Lots of ideas will be rejected. Learners will have a better understanding of the task ahead through thorough testing of ideas.

Development needs to be relevant.
Alongside the practical testing of construction processes, materials and components should be considered. Appropriate tests should determine the suitability of materials for example: wash tests, shrinkage, stain resistance, durability and so on.

Decorative processes for example stitched embellishments such as appliqué and embroidery, paint effects, dyes could also be considered as yet another iteration. Testing leads the way, ideas need to be analysed and developed further or rejected.

Another iteration focusses on functional and performance testing.

Materials are selected and tested for suitability. 3D printing of component parts offer additional iterations in the development of the prototype.

After a number of iterations learners should be drawing closer to the final iteration and chosen idea for manufacture.
A final prototype before manufacture and opinions of users considered. All important details will have been considered for example: form and style; dimensions and sizes; materials and components; construction and decorative process and techniques.
Looking at different patterns, looking at the quality of the material and see if they co-ordinate with each of the feathers.

Fashionable

I could consider using a stronger fabric such as canvas or a needle cord; these would be more hard wearing.

Available in school from the off cuts

Recycled

Recycled

Available in school from the recycled bin

Dotted

Cotton Polyesteer

I have chosen to use these fabrics for the majority of my project because it's a variety of colourful.
I would like to use this pattern piece because it's a simple stitching.

I also like the stitching because it's a bigger pattern and I like the colour.

Embroidery stitch

For the wing, I could create the pattern by using applique.

Sewn edge stitch

All the edges will be turned under and sealed.

My eyes are going to be stitched on with a zigzag stitch.
Evidence of the iterative process of design albeit at a simplistic level. There is clear evidence of modelling and testing of ideas. Some evaluative comments and rejection of ideas.
FORMAL PRESENTATION FOLIO

- A clear pictorial drawing of the final prototype which includes front and back views and exploded diagrams to show important decorative details.

- Presentation drawings can be hand drawn or CAD but always high quality and should include all essential details.

- Learners should consider whether a 3rd party/manufacturer could produce the prototype from the information provided.
A fairly detailed proposal has been presented with most critical dimensions present. Information needed on this page includes:

- CAD CAM CNC data - if it is appropriate.
- Finishing techniques and processes.
- All material and component details needed.

Learners should consider whether a 3rd party/manufacturer could produce the prototype from the information provided.
Additional technical details include:
- Tools and equipment for manufacture.
- Specialist processes.
- Quality Control factors.
- CNC/CAD CAM details speeds and settings if appropriate.

All essential production information that would be necessary for a 3rd party to manufacture the same product.
A plan for manufacture should contain:
- Details of a logical sequence with sufficient detail for a 3rd party to realise the same product.
- An achievable timeline for manufacture.
- Reference to machinery needed for manufacture.
A Gantt chart could provide an overview of time for manufacture. The plan should support the manufacture of the product. If the iterative process has been followed in sufficient detail with testing and practical modelling of ideas learners will have the capability and knowledge to manufacture their products independently and to a good standard.
Final Prototype

- A high quality fully functioning prototype which demonstrates highly appropriate making skills.
- The learner has an excellent understanding of the manufacturing process for this product.
- Specialist processes and materials have been used skilfully with high levels of accuracy achieved.
- A precise outcome.
Analysing and evaluating design decisions and prototypes.

**Evaluation**

My design brief was to design and make a piece of clothing which resembles Matthew Williamson's work but should also be acceptable for the summer time season. I chose to create a two-piece that would be made from bright, vivid colours which were a rich red and a luminous white. I chose to make this because they are quite fashionable and popular amongst the people who fit into my target market. Matthew Williamson's work is known for being heavily embellished or having lots of embroidery but this would be too costly and time consuming for me to add to my outfit so I decided I would add small amounts of embroidery and embellishment so that my outfit meets the requirements of my design brief. For the material of my outfit I used polyester because it is lightweight and would be cool enough to wear in hot weather and the appearance of the material added to my desired look. Although my design is rather basic, the vivid colours and dash of embroidery and embellishment really relates to the preferred style of Matthew Williamson's work. Although there are many two-piece outfits in the industry today I have not seen a similar design to mine.

As a whole, I am very pleased with my outfit. I am pleased with the outcome because my design had quite a few challenging processes but they do not look untidy or messy as a finished piece. As my outfit had to resemble a professional's work I have tried to use many professional finishes which has helped the outfit look neat and of good value. The strategy for writing my evaluation is that I am going to give my opinion on my finished product using the criteria I chose and outlined in my design specification. I believe my finished product does meet many of the requirement stated in the design brief but with one or two left out and I will be discussing why they were not addressed. The function of my product is for it to be suitable for summer seasons parties and events, which I believe it can be. After trying it on I can say that it is fitted to the body in the right amount and way and it is also very flattering and comfortable to wear and move in. There is a button and loop fastening on the top and a zip fastening on the shorts allowing access in and out of both pieces of the outfit. My outfit will possibly be used often but only for a short period of time and believe the manufacturing of the product means it will be able to sustain these circumstances. Overall, I believe it meets the specification points with exception on one or two points. Below I have stated why:

- **Function:** The outfit is designed to be worn during the summer time to parties or events meaning it may be used frequently but in a limited period of time. I made the outfit from polyester which is relatively comfortable to wear and hard wearing at the same time so that the customer can have as much wear out of it as possible whilst still providing a ‘feel good factor’. One of my peers in my textiles class volunteered to try out the outfit and we both were very pleased on the fitting and how easy it was for her to move in and the felt and looked good whilst wearing it. There is a button and loop fastening on the top to allow easy access in and out of the top. I did say that the outfit had to have deep pockets to hold a teenagers essentials. This is not included on my final product as it affected the final look of the outfit and it did not look visually pleasing. As a result of this I decided that any waste material would be made into a matching clutch bag to hold a teenagers essentials.

- **Target Group:** The outfit needs to be made to suit females between the ages 15 and 19 so that it could fit in with the current trend which I believe is achieved with the finished product as I asked a handful of people within this age range and 5/10 people said they would by my item if it was seen in a shop.

- **Size:** The outfit had to be fitted well to the size of the person wearing it which is size 10 so that it can have a positive effect on the customer. Due to the feedback of one of my peers trying the outfit on I believe that the measurement as she said it fitted very well and made her feel good about herself whilst wearing it.

- **Materials:** The material of the outfit must not allow itself to crease so badly that it affects the presentation of the outfit and must be suitable for washing. I used polyester to make my outfit and a small amount of cotton bias binding. Neither of these crease easily or badly unless made to do so and both can be washed easily meaning I have met this criteria.

- **Aesthetics:** The colours I have used are white and a very vibrant red meaning that although I didn’t use a wide variety of colours for it to be colourful the outfit still quite bright and vibrant. I was meant to use a ready-made patterned fabric for some parts of my outfit although there was no material that matched my desired pattern, and any that were close were too costly to buy.

- **Cost:** The cost of all the material and components used did not reach over £20 meaning that the outfit could potentially be sold for less than £30. This helps make it even more available to the target market.

- **Style:** Using research I ensured that the design of my outfit fitted in with the current trends so that it will appeal to my target market which from further research I believe it does. Due to my design brief the outfit had to reflect Matthew Williamson's work and due to use of colour and embellishment I believe I have met this criteria in my design brief and specifications.

- **Finish:** All my edges were finished with a very neat and narrow hem line to make the end product look neat and professional. None of the seams are extremely noticeable meaning I have also met the criteria for the finishes.
To improve my product I could have added pockets to the shorts so it would suit my target market more and match my design.

Improvement 1
Given the chance I would make sure my pattern pieces are all cut to the exact same size so when the outfit is finished the seams meet up.

Before

After

Improvement 2
If I was given more time I would have added more embroidery on the neckline and shorts.

Improvement 3
There are no more improvements that could be made but there are alternatives that could be considered with regards to the fabrics being used. Instead of using polyester a more subtle fabric could have been used possibly for the middle panel. Satin or duchess satin for the middle piece to give it more of an evening look rather than a day time look. I could have also used a printed fabric for the sides of my product which would have resembled Matthew Williamson’s work more.

As an alternative I could have done a square neckline with the black bias binding on the edge.

Learners should respond to feedback from users when considering improvements.

In the example shown some modifications have been offered but lack detail.
Identifying and investigating design possibilities.

Provide details of the Target Market for your product.

Having conducted a consumer survey of 100 people, I have found that 95% of my customers want a docking station or music playing device that will charge their phone. I also found that 83% of my customers would like unique colours of the docking station such as red, black, gold or white as these colours fit in with most room colours whereas 17% preferred gender specific colours like blue and pink. I also found out that 67% of people want the device to be portable, then 69% of people said they would pay between £45-£60 for such a device. I will also look at recyclable materials like timber as 79% of people surveyed said they would prefer it if the product did not harm the environment.

- colours my colour model
- portable or not

Provide details of the results of the Research that you have carried out into the problem.

I have completed a customer survey (results above) and have also learnt about an existing product to find out areas for improvement. I have found that the circuit board and battery pack is housed in timber and the speaker has a diameter of 68mm and depth of 22mm so my docking station must be between a minimum of 65mm x 220mm x 150mm to fit in all the basic components. As long as my design fits these parameters, the smaller the better but also look at the overall design. It should not be more than120mm x 120mm x 30mm to sit on someone's desk and not look too big.

State your Final Design Brief here.

I have decided to design a portable docking station that charges your phone while playing music. It will be compatible with the iPhone 5c, 5s, 6 and 6s as they all have the same charge pin and connector at the minute and are the number one selling mobile phone. The design will have unique colours to appeal to boys and girls and will be innovative in some way through the use of new technologies to make it or as part of the features/functions. It must fit within the minimum and maximum sizes I have said (left).

The design will be sleek and modern and have an unusual shape to make it stand out from its competitors.
Developing a design brief and specification.

The specification must be used as a design tool, and any ideas, models, tests, initial prototypes must be evaluated against the specification criteria. There are important features used as headings with multiple statements within each heading to ‘split’ up the success criteria into manageable aspects. There is a hierarchy of importance.
I have decided to design a portable docking station that charges your phone while playing music. It will be compatible with the iPhone 5c, 5s, 6 and 6+ as they all have the same charge pin and connector at the minute and are the number one selling mobile phone. The design will have unisex colours to appeal to boys and girls and will be innovative in some way through the use of new technologies to make it or as part of the features/functions. It must fit within the minimum and maximum sizes I have said (left).

The design will be sleek and modern and have an unusual shape to make it stand out from its competitors.
Generating and developing design ideas.

INFORMAL Sketchpad
- Initial ideas.
- Basic concepts.
- Scant information.
- Starting point.
- Lots of ideas rejected.
- Shape/form/aesthetics.
- Any starting point!
- Think, model, test, reflect.
- Variety of ideas based on Specification criteria.
- Quick developmental sketching.
- Annotation provides details.
- Decision making supports developmental iterations.
- Good evidence of modelling.
- Testing v Spec.
- Analysis is perceptive.
- Clear decision making.
- A mix of practical activity, sketching, CAD, reflecting.
- Dynamic development!
- Lean design.

This was my original design for my docking station but I felt it was impractical and also risked health and safety as the sharp spike at the top would be too easy to impale your self on. Also it was not that supportive of the phone by not having much of a gradient to place the phone on and nothing on the sides to stop the phone falling off the sides this made the phone susceptible to damage.

Technology
If I add Bluetooth any phone could connect to the dock but I am basing the size of the dock area around the iPhone 6 as this is the largest of the iPhones and the top selling phone at the minute (most people have one). Putting all the connectors for different phones on will start to look messy and untidy and therefore not sleek my customers want.

My sketches from my design ideas show how I changed the shape to make it more sturdy and hold the iPhone better by adding sides and making the base wider. The sides could easily be made from laser cut acrylic. Acrylic comes in lots of different colours in school so I will start to consider this in my design as it develops. The only negative is that there is no obvious handle to pick this up by but if I make it lightweight enough that will not matter.

I used the blue Styrofoam to make multiple designs for my docking station sides. Because I want the curve to hold the phone I tried lots of different cuts. To make sure I didn’t prefer the straight edges like the 1st and 2nd sketch. I tried using just straight edges which is what the picture shows, but I prefer the curve as its more unique and will appeal to teenagers more I think.

Here I am developing the shape of the curved side using a paper template. I checked it against paper cut outs of the speaker and controlled to make sure it all fits.

I constantly need to check that the iPhone 6+ fits the design as this is the biggest phone size.

Speakers
I also designed some different speaker designs for the hole in the middle...

if the holes are too big they will let water in if it is used in a bathroom and damage the electrics, if they are too small no sound will come out!

I like this one because it looks like the dots are bursting out.

Speakers 2
I like this design as it is symmetrical and will work well with my round speaker hole.

Speakers 3
I also like this design because it looks like the wi-fi symbol which is a modern technology. But I think it also looks like a sign from science and might put people off and I think it looks like it will appeal more to boys because of this danger element, so I prefer option 1.
- Functional development.
- CAD used effectively.
- Analysis supports change.
- Physical testing.
- Full understanding demonstrated.
- Testing leads the way.
- Re-think based on testing and outcomes.
- Opinions of users?
- Introduce prototyping.
- Solid modelling.
- CAD/simulations
- Functional/perform ance testing.
- 3D printing.
FORMAL PRESENTATION FOLIO

- A clear pictorial drawing of the final prototype.
- Hand drawn/CAD.
- High quality.
- Detailed presentation.
- Could a 3rd party/manufacturer produce the prototype.
- Detailed proposal.
- All dimensions present.
- CAD CAM CNC data.
- Finishing techniques.
- Could a 3rd party/manufacturer produce the prototype?
- Sophisticated skills evident here.
Manufacturing a prototype.

- Details of a sophisticated logical sequence.
- Achievable timeline for manufacture.
- Supports the manufacture.

<table>
<thead>
<tr>
<th>Task Description</th>
<th>Time</th>
<th>Materials needed</th>
<th>Tools needed</th>
<th>Potential problems</th>
<th>Quality check</th>
<th>Health and safety</th>
</tr>
</thead>
<tbody>
<tr>
<td>Export artwork to the Bedfont router to be cut out v6</td>
<td>30 mins</td>
<td>6m MDF</td>
<td>2D Design, Bedfont</td>
<td>Cutting depths may not be set correctly. Might have to use 3D simulation tool on Bedfont Router to check artwork.</td>
<td>Put all the layers together to make sure they are all the same size and fit properly. Use 3D simulation tool on Bedfont Router to check artwork.</td>
<td>Must be supervised when using Bedfont.</td>
</tr>
<tr>
<td>Glue MDF layers together using Butt Joint (see page 7)</td>
<td>24 mins</td>
<td>6mm pine dowel and PVA glue</td>
<td>G Clamp</td>
<td>PVA glue could cause wood to swell.</td>
<td>Clamp pieces together with enough force to ensure layers stick together. Remove excess glue. Clamp together using scrap MDF between G Clamp and G Clamp.</td>
<td>N/A</td>
</tr>
<tr>
<td>Cut excess dowel rods</td>
<td>15 mins</td>
<td>MDF model (glued)</td>
<td>Bench vice, Clamping saw</td>
<td>Dowel may snap in joint and require fitting. Sand back where dowel rods were</td>
<td>Doweled may snap in joint and require fitting.</td>
<td>Keep fingers back when sawing.</td>
</tr>
<tr>
<td>Sanding</td>
<td>15 mins</td>
<td>MDF model</td>
<td>Belt Sander, T-Square</td>
<td>Over sanding can ruin a square edge and you may have to start again.</td>
<td>Check edges are smooth by touch. Use a tri square to check for square edges.</td>
<td>Supervised when using machine. Wear dust mask, Wear safety goggles.</td>
</tr>
<tr>
<td>Cutting Speaker Holes</td>
<td>4 mins</td>
<td>MDF model</td>
<td>Hole Saw, Bench vice, Sandpaper</td>
<td>Marking out inaccurately can lead to speakers not fitting. Must hold hole saw upright so you don't create a lean in the timber.</td>
<td>Re-check measurements before cutting. Once cut cannot be undone.</td>
<td>Use with supervision. Wear goggles. Wear dust mask. Secure work so it does not slip.</td>
</tr>
<tr>
<td>Apply sanding sealer</td>
<td>2 mins</td>
<td>Sanding sealer</td>
<td>Sanding sealer, Sandpaper, Paintbrush</td>
<td>Sanding sealer isn't very viscous so runs easily so you may get chips in the work surface.</td>
<td>Don't put too much on the brush.</td>
<td>Use in a well ventilated room.</td>
</tr>
<tr>
<td>Apply grey primer</td>
<td>10 mins</td>
<td>MDF model, Grey aerosol primer</td>
<td>Spray Booth, Scrap piece of MDF, Dust mask</td>
<td>Shake can well before use and check the expiry. If it is old the can may be clogged and lots might come out all once. Place model on scrap MDF so you can cover all corners.</td>
<td>When dry see what imperfections have appeared. If there are lots, sand lightly with sand paper and reapply primer.</td>
<td>Use spray booth. Wear dust mask. Use in well ventilated area.</td>
</tr>
<tr>
<td>Apply white spray paint</td>
<td>10 mins</td>
<td>Acrylic</td>
<td>Spray Booth, Scrap piece of MDF, Dust mask</td>
<td>As above.</td>
<td>When dry check surface of model, is it smooth, even, are there any cracks? Reapply if necessary.</td>
<td>As above.</td>
</tr>
<tr>
<td>Export 2D Design file of acrylic parts to laser cutter and cut.</td>
<td>2 mins</td>
<td>Acrylic</td>
<td>2D Design Laser Cutter, Backup gauge</td>
<td>Incorrect settings means you have to re-cut work, time wasting. May not have any of your chosen acrylic left.</td>
<td>Check bed height with gauge. Use test button to check fits on acrylic. Check settings against manual.</td>
<td>Use with supervision. Make sure extraction is on.</td>
</tr>
<tr>
<td>Assembly</td>
<td>1 hour</td>
<td>Acrylic Parts, MDF Model, Terra, Epoxy Resin, Squeezing Church</td>
<td>Use correct glue for task. Epoxy + acrylic to acrylic. Epoxy Resin + acrylic to MDF. Takes a long time to dry, parts may be knocked or slip while waiting.</td>
<td>Use a tri square to check to make sure buttons are glued parallel to edges and look right.</td>
<td>Both glues are toxic, use in a well ventilated area. Make sure it does not come into contact with skin.</td>
<td></td>
</tr>
<tr>
<td>Tailing and Modifications</td>
<td>3 mins</td>
<td>Finished concept model</td>
<td>Survey Ruler, Scales</td>
<td>If feedback is negative you may have to start again or dismantle parts to change/modify them.</td>
<td>Use ruler and scales to check measurable specification points. Use survey to get feedback on aesthetics and suitability for brief.</td>
<td>N/A</td>
</tr>
</tbody>
</table>
Here the learner indicates clearly sizes and machine setting for the making and cutting of the parts of the final product.
Final Prototype

- High quality fully functioning prototype.
- Highly appropriate making skills.
- Excellent understanding shown.
- Specialist processes and materials used skilfully.
- High levels of accuracy achieved.
- A precise outcome.
Analysing and evaluating design decisions and prototypes.

This is my main design that I have made this rocket will have some improvements to it the only thing that I will change will be the colour of the acrylic from brown to bright orange and it will have three holes in the middle of the design with white led lights in the middle of all of it so when you turn the light on you will have a good quality finish to the design I discussed with a variety of people and I showed them all the changes that I could of made for the design like the shape of the base the different but they all said the only thing wrong with this design is the colour of the acrylic this will change the design a lot I was going to have a stand on the back to make sure the rocket don't fall but it will be laid flat on the floor and it will light up the room with a bright orange colour and the battery will not overheat because this will be powered by a cell as you can see I have also added some bolts so if I decide to change the colour it will be a lot easier for me to change the acrylic if I need to and when I drilled the bolts through the acrylic it went right through the wood and now the acrylic piece will not move I have also made the colour see through with lots of holes in the middle of the rocket so when you turn the light on this will give off a bright orange glow in the room I have also added three washers to make sure the acrylic or the wood will not get damaged when using the light this protect the led from getting damaged also when making the design people said I should make my base a little bit thicker because now that its going to be laid flat all the time they reckon I would have more protection on the design as you can see on the first one I had know protection on it so the lights would break easy and all the bottom of the design would have cracks on it the new design that I have made will be a lot safer and this will refer to my specification the wood and the acrylic that used this is the inside of my design this how the led lights will be set up the grey parts will represent the led lights and if you can see there will be three holes in the middle of the design they will be powered by a usb cable this will not require change and it can last up to 10 hours of light it will be low voltage so this will not harm the user of the product but it will have fluorescent acrylic. It is also acrylic red so I will be able to have two colours to the max to add to your light this will also have a hollow shell there will only be one wire attached to the led lights and that will be the usb cable I will solder the usb on to the light the advantage of having a hollow shell is the light will stay internal this is the function of the design to give out light like it said in my specification when turned on the light will be shining through the holes to create bright orange light because when I put the acrylic piece on top of the design so we could have a brighter light for the owner to make the rocket have more light I will be shaping the rocket so that it can stand up straight and I have cut away some of the acrylic piece so where it is dark on your turn on the light it will shine like a lava lamp but there will be all bright orange circles shining around the room and you will be able to have different colours on it as you can see on the middle design you will be able to take it apart and if you want to put your own colour acrylic on it that why I made the design like it I will shape it so them to corners on the bottom of the design and that how the rocket will stand up straight there will be know stand and then you can see three holes is where the lights will come from and to protect the light I will have three washer to protect the light from any dust or water and there will be another three washers protecting the screen so they don't get loose and fall of the design at the bottom of the design is where the usb for powering the light go I will first we will drill a hole in to the middle of the design then we will make it a line of drilling right through the middle of the wood to get from the bottom light to the top light and then I will solder the usb cable to all the wires then I will use filler to cover up all the big line down the middle of the design and then a little switch will be added to the bottom of the design when the filler is done dying you will not be able to see any marks on the design any more the usb switch will not come right through the bottom of the design because then the rocket will not stand up on its own I will be staking the rocket up straight because then it will give out more light to the user I will make sure the edge on the bottom are not sharp due to having hazards to the design the usb will go in the side of the design this will not do anything to the design they are the only changes that I will be making to the design the base will stay the same the acrylic will stay the same I will not be adding any components to it because it has three washers screws but you will be able to change the colour of the acrylic the pictures on the top is representing all the improvements the first to acrylic you could not see much light through them then that why I thought I would have a see through acrylic decorative piece I will be using low powered because then there will be low hazards to the lighting but when turned on this will give out a bright orange light I will still make sure the wood will have a high quality finish to it I will be sanding it many times with wet and dry sand paper but I will not wet it then when it is smooth I will be using the bolt sander this will make sure any marks on the design are gone and then I will be applying wax polish many time to make sure that the design will have the best finish possible you will need to apply the wax with a clean cloth and then if the design did not come out with the shine that you wanted it you could apply some varnish this will make your design smooth and a better quality to the design I will also be taking the felt of the back of the rocket now because it wont be on its side there will be know use to put the felt on I will do the same to the back as I do to the front I will make sure that none of the screws come through the back of the base and the usb cable will be going through the middle I don't think I would improve this design I think I have made it to my best quality.
Evaluation

I have made a lamp, that has orange and pink flower petals and that has a wooden base. The specification point reflects to different colours such as the orange and pink because they stand out the aesthetics is very important because if it looks nice it will be bought and people will spend money on it. The aesthetics could be evaluated visually by when peoples opinions meet the best group.

The purpose of my product is to reflect the chosen era of my design and its designed to illuminate a room and set a mood while being free standing. The main thing is the function so how it works that is very important in my opinion because without a lamp working there’s not really a point in having a lamp. The light reflects to the 1960s because that’s the time period of my design. Its going to be used because it’s a lamp its something that would help you see in the dark. This could be evaluated by seeing if the light actually works. The product is aimed at teenagers 14-16 years old girls living in a house a girly style that makes makes a good teenager, this could be evaluated by checking if it meets the target audience who it is aimed at. This design is used by a a usb and can be placed in a room such as a living room or bedroom for a teenager in the house. This could be evaluated by making sure everything is in its right position so when its needed its easily found and could be used.

The main measurements are the length, width and height of my product is 36-40cm and the length is 10cm and the width is 10-15, the size is very important because you need to know if it would fit where it would be placed so wont be to big or small. This could be evaluated by checking if it’s the size you wanted or thought would come out to. The main parts are my flower petals and my base, my main materials are wood and plastic I used acrylic for my petals and I used pine for my base. The product is joined together by glue.

The safety features are no sharp edges no loose parts safety is very important because in case you get get cute and have deep bleeding and other injuries to so should keep away from sharp edges health is first. Safety could be evaluated by making sure no sharp edges and its all nice and smooth nothing dangerous. I have checked the quality control by making a visual test and a touch test to see if its good. The finished product would cost would be around £10. The cost is important because your making the design and you need to get a reasonable amount back. This could be evaluated by seeing if the materials were good quality so from that the price would be selected.

My product wouldn’t effect the environment, the wood is from a sustainable source, its very important that you would use friendly wood because it comes under safety, also the right amount of energy should be used. This could be evaluated by seeing if it’s a sustainable source. Possible conflicts energy skills products costs of the materials vs. size of the design complication or difficult design vs. skills and ability choice of material vs. what is available and what costs. The conflicts is important because I have chose a design which could be made to a great standard, with my marked and equipment that could be made in school this could be by the slandered and quality of the lamp.

My over all design meets my design brief but I have added a few changes.

My lamp works its free standing and it lights. The shape and the size meet my initial suggestions because its all as planned. I think my final product matches the design on mage 10 and 11. I did not make any changes because changes didn’t need to be made to my design, I’m happy with the materials I chose to make my design out of I chose pine for my base and acrylic for my petals. To make my product I would pain my base in a darker colour so it stands out and is eye-catching instead of the natural look. And I would also add another layer of petals underneath the two but a bigger version in a darker colour so it gives a lift to my design. The colour scheme is how I accepted it to be I would improve it to make it better by using black and white petals. This would definitely alter the cost of my design because it would look more original and unique. My solution is safe to use the reason being is because I have no loose bits and I don’t have any sharp edges there nice and smooth. The techniques I used to make my solution adequate I would won’t use different range of manufacturing techniques. My design looks very nice unique and modern and lightens the atmosphere in the room because of the light colours used. My target audience group have came up with different suggestions in how to improve my design how it could look more original by changing the colours of the flower petals and varnishing my base and making sure there was no scratches on the wood.

Both evaluations discuss and reflect on the specification. There should be evidence of modifications which should have been done using sketches and detailed diagrams of the changes.
Further support and resources

There are a free range of digital resources available for centres which can be found on: http://resources.eduqas.co.uk/Pages/ResourceByArgs.aspx?subId=8&lvlId=0

Examinations and assessment

Command words

To assist teachers when preparing learners for the examination they may like to consider the following information.

This table is intended to define the command words used in papers and explain how they are used and what is expected from the learner.

<table>
<thead>
<tr>
<th>Command words</th>
<th>Marks</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Give State Name</td>
<td>1 mark</td>
<td>These command words will feature in the early parts of questions.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>These are designed to ease the learner into the question. They need a</td>
</tr>
<tr>
<td></td>
<td></td>
<td>simple statement or a short phrase. They do not need elaboration or</td>
</tr>
<tr>
<td></td>
<td></td>
<td>explanation in the answer.</td>
</tr>
<tr>
<td>Describe Outline</td>
<td>2 marks</td>
<td>These command words will be commonly used on the paper and will feature</td>
</tr>
<tr>
<td></td>
<td></td>
<td>in many questions.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>These questions ask the learner to describe something in detail. The</td>
</tr>
<tr>
<td></td>
<td></td>
<td>answer will be in sentences and/or in a list. There is a need for detail</td>
</tr>
<tr>
<td></td>
<td></td>
<td>in the answers with elaboration of the answer.</td>
</tr>
<tr>
<td>Explain Justify</td>
<td>2 or more</td>
<td>These command words will be commonly used on the paper and will feature</td>
</tr>
<tr>
<td></td>
<td>marks</td>
<td>in many questions.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>These questions are asking the learner to respond in detail to the</td>
</tr>
<tr>
<td></td>
<td></td>
<td>question providing a full answer with an explanation. Full and detailed</td>
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<tr>
<td></td>
<td></td>
<td>sentences will be required and will often contain the word &quot;because&quot;. A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>short phrase will not be acceptable, the learner will need to make a</td>
</tr>
<tr>
<td></td>
<td></td>
<td>valid point and justify it.</td>
</tr>
<tr>
<td>Evaluate Analyse</td>
<td>2 or more</td>
<td>These command words will feature towards the end of some questions.</td>
</tr>
<tr>
<td></td>
<td>marks</td>
<td>• Evaluate could involve assessing or appraising a situation or product</td>
</tr>
<tr>
<td></td>
<td></td>
<td>or material giving reasons to support their answers.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Analyse means examining and dissecting a situation or product giving</td>
</tr>
<tr>
<td></td>
<td></td>
<td>thoughtful appropriate reasons to support the answer. It could include</td>
</tr>
<tr>
<td></td>
<td></td>
<td>finding logical chains of reasoning.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>These questions are designed to test, stretch and challenge the more</td>
</tr>
<tr>
<td></td>
<td></td>
<td>able learner. The question requires the learner to make a well-balanced</td>
</tr>
<tr>
<td></td>
<td></td>
<td>argument involving both advantages and disadvantages. Extended writing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>will be required.</td>
</tr>
</tbody>
</table>
Banded descriptors

This form of assessment will be associated with the questions that specifically require an extended answer. It will also be used in questions where the quality of written communication is to be assessed.

<table>
<thead>
<tr>
<th>Incorrect/no answer.</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brief analysis with little detail of.</td>
<td>1 - 2</td>
</tr>
<tr>
<td>Quality of Written Communication is limited, presenting material with limited coherence, many errors of grammar, punctuation and spelling.</td>
<td></td>
</tr>
<tr>
<td>More detailed analysis, with some explanation of required.</td>
<td>3 - 4</td>
</tr>
<tr>
<td>Quality of Written Communication is basic, presenting occasionally appropriate material with some coherence, some errors of grammar, punctuation and spelling.</td>
<td></td>
</tr>
<tr>
<td>Detailed analysis and explanation of the types of.</td>
<td>5 - 7</td>
</tr>
<tr>
<td>Quality of Written Communication is good, presenting mainly appropriate material in a coherent manner, few errors of grammar, punctuation and spelling.</td>
<td></td>
</tr>
<tr>
<td>Clear and detailed analysis and explanation of the types of.</td>
<td>8 - 10</td>
</tr>
<tr>
<td>Quality of Written Communication is excellent, presenting wholly appropriate material in a coherent and logical manner, hardly any errors of grammar, punctuation and spelling.</td>
<td></td>
</tr>
</tbody>
</table>

The following are general examples of questions with information about how they would be marked.

Examples

Question 1

Give two reasons why paper is sometimes laminated.  
What is required?  [2]
The question is a straightforward "give" question so short statements or phrases are needed and they do not need justification.

Weak answer

Reason 1: Makes the paper stronger. (1)
Reason 2: (0)

*Here the learner gives one relevant answer. However they have not attempted to state a second reason. It is vital that all parts of questions are answered.*

Good answer

Reason 1: Makes the paper stronger. (1)
Reason 2: Protects the paper. (1)

*Here the learner gives two relevant answers.*

Question 2

Eight card handles for a carrier bag can be CAM cut from one A3 sheet of card. Describe one advantage to the manufacturer of doing this. [2]

What is required?

The question asks the learner to describe an advantage that the manufacturer would gain from cutting more than one handle from each sheet of card. Short statements or phrases will not be adequate. A clear description with justification using a sentence or sentences is needed.

Weak answer

It is cheaper because the handles can be made in batches which reduces costs. (1)

*Here the learner gives a relevant answer but the learner does not give any detail of the advantage.*

Good answer

It reduces the cost of making the handles, as there will be less waste material than cutting one handle from each piece of card. (2)

*Here the learner gives a full and detailed answer in a well-constructed sentence.*

Question 3

Explain why it is necessary to score printed card that is 500 microns thick before folding it to make a package [3]

What is required?

- The question asks the learner to explain the reasons for having to score card before folding.
- Short statement will not be adequate.
- A clear explanation using a sentence or sentences is needed clearly stating a reason and then elaborating the answer with appropriate reasons.
Weak answer

500 micron printed card will not fold easily so scoring the card makes the card able to be folded. (1)

*Here the learner gives a relevant answer but does not give any detail to support their assertion.*

Satisfactory answer

- It makes the card easy to fold because it makes a dent in the card where it is to be folded. (2)

*Here the learner gives a relevant answer and does give some detail to support their assertion. The detailed reason is rather superficial, as it does not explain why the card is easier to fold.*

Good answer

- It makes the card easy to fold because it makes a dent in the card where it is to be folded. This dent stretches some of the fibres and squashes others into a U shape so that they are ready to fold. (3)

*Here the learner gives a full and detailed answer in well-constructed sentences. They show a detailed understanding of the reasons that allow the process to work.*
Suggested frameworks for delivery

This GCSE in Design and Technology is designed to be taken by 16 year-old learners following a two-year programme of study comprised of 120 guided learning hours (GLH). This is reflected in the breadth, depth and challenge of the content that learners will be assessed against.

*Note: Alessi is not part of the specification, it is purely a theme used in the design of the key fob.*

<table>
<thead>
<tr>
<th>WJEC GCSE D&amp;T New Specification – Year 10 Possible Course layout</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sept</td>
</tr>
<tr>
<td>New and Emerging Technology</td>
</tr>
<tr>
<td>Design Practice 1</td>
</tr>
<tr>
<td>Alesi CAD CAM Keyfob</td>
</tr>
</tbody>
</table>

### Core knowledge & Understanding

- D&T and our world
- CAD CAM
- Emerging Technology
- Electronics
- Materials / Polymers
- 3D printing PLA
- Study on designers
- Professionals
- Companies
- In Wales
- Their style
- Products / USP
- Their impact
- Sustainability
- Energy – solar -wind
- Greener design
- Ecological footprint
- Generating clean energy
- Life cycle analysis
- Cradle to cradle
- Thermo’s
- Photo’s
- SMA and nitinol
- Polymorph
- QTC pills
- Fibres
- Others

### Core Designing & Making Principles

- D&T Practice
- User needs
- Brief / Specification
- Iterative design development
- Work of others
- Prototyping
- Decision making
- Users
- Sketching
- Ideas / concepts
- Prototypes
- Evaluating
- User trials

### Product Analysis

- Material areas may vary
- Group activities
- Different mechanical systems / outputs
- Iterative designing
- The study of a wide range of products that use SMART, modern and technical materials

### In depth Designing & Making

- Mini tasks
- Specialist processes
- Specific practical skills
- Further study
- Examination practise
- Challenge / advanced content
- Preparation for NEA in Yr11

Note: NEA – 3 Contexts Released by WJEC 1st June
Context analysis – multiple starting points
NEA tasks begins – 35 hours
Sketchbook analysis
Formal Portfolio
## Eduqas GCSE D&T New Specification – Year 11 Possible Course Layout

<table>
<thead>
<tr>
<th>Sept</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Assessments</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEA – Context</td>
<td>NEA – Prototyping</td>
<td>NEA – Prototyping</td>
<td>NEA – Testing, Final Evaluation</td>
<td>NEA - Context Released on June 1st</td>
<td>NEA – Refinement of Proposal</td>
<td>Completion of Final Prototype</td>
<td>And modifications</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Centres / candidates can start analysing contexts</td>
<td>Informal Sketchbook work</td>
<td>Final Prototype</td>
<td></td>
<td></td>
<td>Informal Sketchbook work</td>
<td>Final Prototype</td>
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<tr>
<td></td>
<td>Formal Folio work</td>
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</tbody>
</table>

### Iterative Designing

- Research into the context
- Understanding User requirements
- Considering range of possible design briefs
- Sketching ideas
- Disassembly / analysis of other products
- Modelling & testing
- Inspiration sources
- Further research
- **ITERATIVE CYCLE (NO STARTING OR ENDING POINT)**

### Manufacturing Final Prototype

- Production
- Quality control
- High quality skills
- Safe use of equipment and machinery
- Accuracy in implementing final prototype
- Final assembly
- High quality finish

### Evaluating Final Prototype

- Testing of Final Prototype in context
- User Trials and analysis
- Specification
- Identification of modifications
- Expert advice / opinions
- Evaluation techniques

### Outcomes

- Full understanding / appreciation
- Range of possible briefs evident
- Clear Final Brief and Specification
- Varied research / investigation results
- Early models, test pieces, experiment

### Endings

- Materials / manufacturing methods
- Risk Reward
- Aesthetics / form / appearance

- Scale / models
- CAD simulations
- Card / foam / 3D
- Evidence of testing
- Evolving iterations
- Jigs, formers, patterns, templates, moulds.

- Analysis of development
- Iterations
- Final Prototype construction
- Final assembly
- Finishing techniques applied

- Final evaluation in Formal Folio
- Opinions of Users through testing
- Final Prototype
- Prototype V Spec
- Identify / make modifications

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Deadline for NEA Marks – secure website – 2nd week May
GCSE Moderation - 3rd / 4th week May
GCSE D&T Examination Paper – end May / early June
<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does this qualification count in performance tables?</td>
<td>Yes. This qualification counts within performance tables. Adamit.</td>
</tr>
<tr>
<td>What is the split in the qualification for the exam and coursework units?</td>
<td>50% for each unit (Exam and Non-exam assessment).</td>
</tr>
<tr>
<td>How will the units be assessed?</td>
<td>Exam unit – Externally examined (2 hours, 100 marks). Non-exam assessment (NEA) – Internally marked and externally moderated (approx. 35 hours, 100 marks).</td>
</tr>
<tr>
<td>Will there be any resources available?</td>
<td>We are currently working on a website which will include useful resources, such as information on materials and processes, plus quizzes for learners. This will be ready for the start of the new specification.</td>
</tr>
<tr>
<td>Does WJEC provide a Scheme of Work for delivering the new specifications?</td>
<td>We will provide a basic guide to schemes of work but it will be up to centres to apply to their own timetable structure.</td>
</tr>
<tr>
<td>How is the exam structured?</td>
<td>A mix of short answer structured and extended writing questions. All questions are compulsory.</td>
</tr>
<tr>
<td>Weighting of questions?</td>
<td>There will be weighted questions. e.g. 1 mark, 2 mark, 4 mark, 6 marks questions etc.</td>
</tr>
<tr>
<td>Forms of questions?</td>
<td>The learner will be expected to write formal structured answers, use diagrams to support answers, complete diagrams etc.</td>
</tr>
<tr>
<td>Question</td>
<td>Answer</td>
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<tr>
<td>-------------------------------------------------------------------------</td>
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</tbody>
</table>
| How many assessment criteria is the NEA split into?                      | 5 assessment criteria:  
- Identifying and investigating design possibilities (10 marks)  
- Developing a design brief and specification (10 marks)  
- Generating and developing design ideas (30 marks)  
- Manufacturing a prototype (30 marks)  
- Analysing and evaluating design decisions and prototypes (20 marks) |
| Will there be a prescribed workbook for learners to work on?             | There is no prescribed workbook. Learners are to use a formal portfolio and an informal sketchbook. This will be to encourage an iterative approach to design and development of their work. |
| What should be included within the sketchbook and portfolio?             | The iterative process is essential to NEA. It is anticipated that centres will be providing evidence on:  
Reviewing contextual challenges, reviewing primary/secondary research, suggested design briefs, final design brief, testing, initial design ideas, refinement and development of ideas, prototyping, evaluative decision making, high quality 2D/3D images of proposals, planning/timelines, modifications and evaluations, final prototype of finished product etc. Worth noting that when we moderate will expect to see everything that the learner has used in the development of the design and project. |
<p>| Can the portfolio be purely digital?                                    | Yes, the portfolio can be entirely digital. If this is appropriate for the work undertaken and enables the learner to fully and successfully address all aspects of the Assessment Objectives. Drawing can be included, for example, through the use of a stylus and graphics tablet or by simply scanning hand drawn sketches. There must though be evidence of a range of design strategies within the e-portfolio. |
| Will there be set briefs?                                                | There will be three contextual challenges made available from 1st June in the year prior to the award. They will be designed so that learners can go down the route of their area of interest. Centres are encouraged to let the learner decide upon their own design brief. |</p>
<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>How will the design and make unit be assessed?</td>
<td>Internally marked and externally moderated. A WJEC EDUQAS moderator will visit the centre and look at the sample generated by the online mark input system. Verbal feedback will be provided (marks will not be discussed) as well as a written report made available on results day.</td>
</tr>
<tr>
<td>What paper size should be used?</td>
<td>We are suggesting that A4 or A3 paper size should be used. Our recommendation is no more than 20 x A3 (approximately). Please note this is a recommendation, what we don't want to see is that centres are making learners do more and more sheets because volume creates more marks. This will not be the case, it is the quality of the work that is submitted that will decide upon the marks.</td>
</tr>
<tr>
<td>Are teachers able to give guidance?</td>
<td>Essential at the start of the NEA, to ensure that the learner does not set a problem that is unachievable in the time limit.</td>
</tr>
<tr>
<td>Can work be taken home?</td>
<td>Yes. The majority of the work should be done within the school to ensure that the assessor is able to authenticate the work as being the learner's own. We suggest that you only allow the learners to take home what they are working on and leave the rest of the work in a secure place within the school.</td>
</tr>
<tr>
<td>Are writing frames allowed?</td>
<td>No. As soon as you add in framed boxes onto pages it is classified as leading the learner, which is not allowed.</td>
</tr>
<tr>
<td>Can a specific making process be done by an outside company?</td>
<td>Where a specific making process needs to be done outside the school or college, each learner must produce their final prototype or prototypes under <em>immediate guidance or supervision</em>. This means the prototype(s) have to be produced either: (i) with the simultaneous physical presence of the learner and the supervisor, or (ii) remotely by means of simultaneous electronic communication. In most cases supervision will be of the form described in (i), but in some circumstances, for example, if the learner is carrying out a specialist process away from the centre, (ii) may be more appropriate.</td>
</tr>
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<tr>
<td>Can practical work be done at home?</td>
<td>All practical work should be completed within the school or college under the guidance or supervision of the teacher. The final prototype should be completed within the school or college and not be allowed to be taken home at any point.</td>
</tr>
</tbody>
</table>