

Edexcel GCSE

Manufacturing

Controlled Assessment

Teacher Support Book 2012



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Unit 1 5MN01 Designing Products for Manufacture

Unit 2 5MN02 Manufactured Products

Welcome to the GCSE Manufacturing 2012 Controlled Assessment Teacher Support Book

This Controlled Assessment Teacher Support Book has been designed to provide you with the answers to key questions that will arise during the teaching and assessment of Controlled Assessment GCSE Manufacturing, Units 1 and 2.

The book is divided into three sections:

- an introduction to controlled assessment
- the range of activities for the two units
- assessment information, including a detailed overview of typical expected evidence to address the assessment criteria.

Expert advice from the people who know

We hope you find this document useful and look forward to continuing to work with you on our GCSE specifications. We are on hand to answer your questions so please feel free to get in touch.



Brian Crossland
Principal Moderator

To contact our GCSE Manufacturing senior examining team please visit the website www.edexcel.com/expert.

To speak to our Manufacturing Subject team, please call 0844 463 2824 or email TeachingManufacturing@pearson.com.

We look forward to working with you.

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Unit 1: Designing Products for Manufacture

Unit 2: Manufactured Products

Levels of control in controlled assessment

The specification for this qualification states that controlled assessment is required for Unit 1 and Unit 2 and that three levels of control are set:

- for task setting
- for task taking
- for task marking.

Task setting

Task setting is set at a high level of control. The controlled assessment tasks, written by Edexcel for these units, have been devised to provide this high level of control, whilst still allowing centres to contextualise the work set to meet local needs and to use the resources available to the centre. Hence the 2012 Olympics can be replaced by another event, or indeed by a totally different scenario, but the activities set within the controlled assessment must still be adhered to.

Task taking

Task taking is set at a medium level of control. It is these controlled conditions in which candidates perform these tasks that are the main focus of this centre guidance.

Task marking

Task marking is also set at a medium level of control. Marking of the tasks will be carried out by centre teachers and moderated by Edexcel.

Controlled conditions for task taking

Controlled assessment refers to the production of the evidence requirements for Unit 1 and Unit 2 under controlled conditions. Controlled assessment is a supervised period of approximately 23–33 hours for each unit, during which time the candidate produces the portfolio and product evidence that will be assessed. Controlled assessment is designed for the production and assessment of portfolio work and needs to be separated from the teaching and learning process.

A current centre assessment policy might need to be developed on the basis of this guidance in order to incorporate controlled assessment requirements and procedures.

The teaching, learning and practice processes that are necessary to prepare the candidate for the task-taking period of controlled assessment will need to be designed, and delivered, before the controlled assessment period. Centre staff will not wish to use the time constraints of controlled assessment to undertake tutoring and tuition. The purpose of controlled assessment is to provide opportunity for the candidate to apply the skills and knowledge already learnt to the tasks contained in the controlled assessment task for each unit, in the time period allocated.

Candidate work for portfolios and products can be produced only during lesson time when supervised. Candidate work must be collected in at the end of each controlled assessment lesson and handed back out at the beginning of the next controlled assessment lesson. Where the portfolio is being compiled electronically, access to the development of the candidates' work must also be restricted to designated lesson times, when supervised. Ensuring there are mechanisms which control such access is the responsibility of each centre.

Preparatory or developmental research, note-making, draft ideas, sketches, planning ideas, etc, may all be undertaken by the candidates away from the controlled conditions and can be made use of during the controlled task-taking lessons as reference materials. The requirement for 'limited supervision' is that the teacher/supervisor of the controlled assessment lessons ensures that work is not brought in by candidates, paper-based or electronic, and simply inserted into their portfolio. Marks can only be awarded for each candidate's own work and this must be monitored and controlled by each centre according to their resources. The designated 23–33 hours of controlled assessment for each unit should be viewed as the time-constrained opportunity to convert such preparatory work into a final portfolio version and to undertake, and provide evidence of, the various practical tasks required by both units. The research material, notes, drafts, etc are not required for assessment. Appendices are not normally required as they are not normally looked at when marking/moderating. Marks are awarded only for candidate work in the main body addressing the eight assessment criteria ('a' to 'h') by following the tasks/activities which are set in the controlled assessment.

The use of centre-prepared proformas or writing frames for completion by candidates for various tasks is well developed for this qualification and this practice may be continued. Centres should, however, note that the layout of proformas can limit candidates to the production of 'basic' identification evidence. The higher mark credit that comes with 'description', 'explanation' or 'justification' needs to be encouraged through candidate work beyond the use of any proforma or writing frame. Use of word processors can allow tables and other writing frame layouts to grow as the candidates type work into them. These, or free writing, are to be encouraged to allow candidates to perform without undue restriction on word limit.

The role of teachers during controlled assessment

During the controlled assessment periods, the role of the teacher is an important one. Teachers should:

- provide supervision of the controlled assessment conditions
- provide supervision of safe systems of working and of health and safety in general
- observe and record individual candidate performance, to inform their own marking of candidate evidence against the criteria, and the witness statement(s) they will need to make
- provide, and to be able to comment on, the levels of 'support and guidance' given to individual candidates, informing their marking decisions for the criteria for both units
- be able to confirm that the portfolio and product work presented was completed within the designated 23–33 hours
- be able to authenticate the candidate work as being their own
- provide formative feedback (see below)
- supervise the controlled assessment activities.

Formative feedback during controlled assessment

Teachers may provide regular formative feedback during controlled assessment. This might take the form of:

- indicating what is missing in candidate work reviewed, pointing out what has not been evidenced
- indicating what is insufficient in the candidate work
- a discussion directly comparing work at a given stage with the requirements of the criteria by indicating what is evidenced, and what is not
- a review with the candidate of actual progress made, against planned progress within the controlled assessment period (possibly by indicating where time has been lost and how to focus on the parts which could generate the highest points in the time remaining)
- comments on the quality of written communication provided and the level of marks likely to be obtained for this aspect of the assessment, where appropriate, perhaps suggesting spelling/grammar checks.

It should be noted that any amendment or development of the candidate work that is identified during this formative feedback must be undertaken during the controlled assessment period. Centres will need to point out at an early stage that further work to address criteria requirements to 'describe' and 'justify', for higher marks, must be done in the designated controlled period. (The assessment must not be taken away and re-worked without the necessary supervision.)

Demonstrations of practical activities can be provided to help develop knowledge, understanding and skills, particularly where health, safety or welfare issues arise relating to specific tools, equipment or processes, where it would be unreasonable to expect the candidate to have sufficient expertise to work independently.

The range of activities for the units

The specifications and assessment criteria for Unit 1 and Unit 2 also indicate the ranges of tasks that need to be completed during controlled assessment. These are shown in the table below.

Unit 1	Unit 2
Analysing the brief*	Work as part of an effective team
Specification – product criteria and material constraints*	Produce a schedule for manufacture*
Specification – production requirements and quality standards*	Prepare and use materials
Ideas and design solutions*	Prepare and use tools, equipment and machinery
Testing and selecting the final solution*	Manufacture products to meet requirements
Prototype	Monitor production
Presentation techniques	Use quality control techniques
Final review*	Modify production plans and schedule for manufacture

* Opportunity to be assessed on quality of written communication

The evidence of all these activities needs to be produced during the controlled assessment period. Centre staff will need to allocate appropriate times to each activity, so that 23–33 hours are used in total. Some guidance on suggested times is provided in the Sample Assessment Materials (SAM) publication produced by Edexcel for GCSE Manufacturing. The SAM provides suggested timings of each of these activities. For Unit 1 (on page 4 of the SAM), suggested times indicate approximate division into 5–8 hour sections for ‘investigation’, 6–7 hours for ‘design’, 5–8 for ‘make’, 5–6 for ‘communication’ and 2–4 hours for ‘evaluation’. Page 12 of the SAM suggests Unit 2 ‘manufacturing the products’ requires 18–25 hours, between 70 and 80% of the total controlled assessment time.

For Unit 1, it follows that around half of the suggested time allocated for controlled assessment should be spent on the investigation and design for manufacture, with the other half of the time being split between making a prototype, followed by communicating ideas and evaluation. Please also note that the 23–33 hours includes time for gathering and writing the evidence of these activities in final portfolio form.

For Unit 2, evidence gathering of performance as a team member should be collected throughout all activities. Unit 2 may require 3–5 hours to be devoted to the production of a schedule for manufacture, and the review and evaluation requires 2–3 hours at the end, although review comments can be collected as they are generated throughout the whole controlled assessment. The majority of the time must be spent making the products (activities ‘c’ to ‘g’). The 23–33 hours, again, includes time for writing and compiling evidence in the final portfolio.

Section 2: Range of activities

Portfolio-building activities can realistically be allocated 10 hours for each unit. Centres will therefore appreciate the need for appropriate teaching and learning to be delivered **before** the controlled assessment period begins, so that this period can be used to focus on the necessary activities and the follow-up to any formative feedback provided, along with essential health and safety reminders, demonstrations, etc, as required.

Details of the activities required for the assessment of Unit 1 and Unit 2 are described in the controlled assessment tasks written by Edexcel. The evidence expected to be presented for each unit to satisfy the assessment requirements is detailed from the next page onwards.

The assessment of quality of written communication

Both Unit 1 and Unit 2 specifications include assessment criteria that make provision for points to be awarded for the quality of written communication used. The controlled assessment tasks devised for the controlled assessment of these units include this provision as required by the specification.

For both units, the candidate work required to achieve the standards needed for the 'quality of written communication' marks must also be done as part of the designated time of the controlled period.

Expected evidence

Unit 1: Designing products for manufacture

a) Analysing the brief*

Mark range 1–2	Mark range 3–4	Mark range 5–6
An analysis of the brief to identify basic client needs, with identification of some key features of the product. The key features identified are briefly listed, make little use of correct grammar and include frequent spelling mistakes, with incorrect or inappropriate use of terminology.	Analysis of the brief to identify the main client needs, with a description of the key features of the product. The description of key features includes a sound standard of spelling and punctuation. Terminology is mostly used appropriately.	Analysis of the brief to explain the main client needs, with a justification of the key features of the product. The analysis makes good use of accurate terminology and grammar, and few punctuation and spelling errors.
Expected evidence	Expected evidence	Expected evidence
<p>A brief listing or bullet points of some relevant client needs (1).</p> <p>A brief listing or bullet points of some relevant key features of the product (1).</p>	<p>Identification of main client needs with sound spelling and use of terminology (2).</p> <p>Description of key features with sound spelling and use of terminology (2).</p>	<p>Explanation of client needs with accurate use of terminology, grammar and punctuation (3).</p> <p>Justification of key features with accurate use of terminology, grammar and punctuation (3).</p>
<p>Note: throughout these assessment grids, under 'Expected evidence', the scores in brackets indicate the maximum for each criterion, e.g. up to a maximum of 6 for this criterion.</p> <p><i>Client needs</i> include: cost, quantity required, intended market, timescales and product function.</p> <p><i>Key features of the product</i> include: styling, aesthetics, size (with tolerances), quality standards (such as BS, EN, CE, specific company standards, etc) and performance.</p> <p>It is helpful for candidates to present this analysis under specific headings, or as an expandable writing frame/table using a word processor, i.e. Clients Needs, Key Features (as identified in the controlled assessment activities). If this analysis is not identified under specific headings, then the assessor should look for evidence under the lists above and map this on the mark record sheet and/or annotate the candidate work to identify the location of each item.</p> <p>*Marks available for quality of written communication are built into expected evidence requirements.</p>		

Section 3: Assessment information

b) Specification – product criteria and material constraints*

Mark range 1–2	Mark range 3–4	Mark range 5–6
<p>Production of a design specification that identifies the basic details of the product criteria and the material constraints.</p> <p>Design specification makes little use of correct grammar and includes frequent spelling mistakes, with incorrect or inappropriate use of terminology.</p>	<p>Production of a design specification that describes some of the main details of the product criteria and the material constraints.</p> <p>Details are presented using sound standards of legibility, spelling and punctuation. Terminology is mostly used appropriately.</p>	<p>Production of a design specification that explains the main details of the product criteria and the material constraints.</p> <p>Few grammar, punctuation and spelling errors and there is good use of accurate terminology.</p>
Expected Evidence	Expected Evidence	Expected Evidence
<p>Design specification which includes lists, tables or mindmaps of:</p> <ul style="list-style-type: none"> • basic product criteria (1) • basic material constraints (1). 	<p>Design specification, using sound standards of legibility, spelling and punctuation which describe some main details of:</p> <ul style="list-style-type: none"> • the product criteria (2) • the material constraints, with appropriate use of terminology (2). 	<p>Design specification, with few grammar, punctuation and spelling errors and good use of terminology, which explains the main details of:</p> <ul style="list-style-type: none"> • the product criteria (3) • the material constraints (3).
<p>Note: for the specifications, try to include a range of 'measureables': size, length, height, width, radius, weight, etc, with tolerances, to allow evaluation in sections 'e' and 'h' or others as appropriate.</p>		
<p><i>Product criteria</i> includes: product performance, intended markets, maintenance requirements, size (with tolerances).</p> <p><i>Material constraints</i> include: materials and their availability, properties, characteristics and performance, handling and storage, material cost, regulations (UK and/or European, or other industry relevant ones), health safety and hygiene (with references to www.hse.gov.uk or another source), scale of production required, quality standards and limitations of available machinery tools or equipment.</p> <p>*Marks available for quality of written communication are built into expected evidence requirements.</p>		

Section 3: Assessment information

c) Specification – production requirements and quality standards*

Mark range 1–2	Mark range 3–4	Mark range 5–6
Production of a design specification that identifies the basic details of the production requirements and quality standards. Design specification makes little use of correct grammar and includes frequent spelling mistakes, with incorrect or inappropriate use of terminology.	Production of a design specification that describes some of the main details of the production requirements and quality standards. Details are presented using sound standards of legibility, spelling and punctuation. Terminology is mostly appropriate.	Production of a design specification that explains all the main details of the production requirements and quality standards. Details are presented using sound standards of legibility, spelling and punctuation. Terminology is mostly used appropriately.
Expected Evidence	Expected Evidence	Expected Evidence
Design specification, containing listings, tables or bullet points identifying basic: <ul style="list-style-type: none"> • production requirements (1) • quality standards (1). 	Design specification, written with sound standards of legibility, spelling and punctuation, containing descriptions of: <ul style="list-style-type: none"> • production requirements (2) • quality standards (2). 	Design specification, written with sound standards of legibility, spelling and punctuation, containing explanations of: <ul style="list-style-type: none"> • production requirements (3) • quality standards (3).
<p>Note: for the specifications, try to include a range of 'measurables': size, length, height, width, radius, weight, etc, with tolerances, to allow evaluation in sections 'e' and 'h' or others as appropriate.</p> <p><i>Production requirements</i> include: quantity being made, size, weight, cost, time to manufacture.</p> <p><i>Quality standards include:</i> tolerances (which relate specifically to those in 'a' and 'b'), materials specifications, finish, performance and requirements – with reference to the client's needs.</p> <p>Referring to appropriate Regulations and Standards, it is important that candidates describe (MB2) or explain (MB3) the specific regulation/standard and how their design will adhere to that standard. The statement "will meet the appropriate British Standard(s)", will only meet MB1. A generic explanation of British/ISO Standards, Kite Marks, etc, does not constitute higher achievement. It must relate to the product, the design and the client's needs to meet MB3.</p> <p>*Marks available for quality of written communication are built into expected evidence requirements.</p>		

Section 3: Assessment information

d) Ideas and design solutions*

Mark range 1–2	Mark range 3–4	Mark range 5–6
Generation of basic design ideas and the development of simple manufacturing design solutions. Ideas and solutions include frequent errors in spelling and grammar. Terminology is not used accurately or appropriately.	Generation of alternative design ideas and the development, in some detail, of manufacturing design solutions. Ideas and solutions are presented using sound standards of spelling and punctuation. Terminology is mostly used appropriately.	Generation of imaginative design ideas and the development of detailed and appropriate manufacturing design solutions. Few grammar, punctuation and spelling errors and there is good use of accurate terminology.
Expected Evidence	Expected Evidence	Expected Evidence
Portfolio contains: <ul style="list-style-type: none"> two or more basic design ideas or sketches (1) simple solutions of how to manufacture them including annotated sketches (1). 	Portfolio, presented using sound standards of spelling and punctuation, contains: <ul style="list-style-type: none"> two or more alternative design ideas in some detail (2) some detail of manufacturing design solutions, using appropriate terminology (2). 	Portfolio, including few grammar, punctuation and spelling errors and accurate terminology, contains: <ul style="list-style-type: none"> two or more detailed, imaginative design ideas (3) detailed and appropriate manufacturing design solutions (3).

Note: as this is 'Design for Manufacture' both elements must be evidenced – design ideas **and** the manufacturing of these ideas. If only design ideas are produced, the maximum mark for this criterion is 3.

Design ideas should include consideration of achieving the client's requirements, capable of being manufactured when material and product constraints are considered, etc. For the low mark band, the ideas may be close copies of existing ideas and artefacts lacking originality or imagination. For the higher mark bands, marks are for quality and imaginative production of relevant designs for the client's needs, and increased detailed consideration of how they may be manufactured, not for an increased quantity of designs.

Manufacturing design solutions should specifically indicate how the processes of manufacture can be applied to realise the product. This could then be used to eliminate one or more designs in section 'e'.

Note: class questionnaires are not encouraged for this criterion as these can lead to solutions that lie outside the customer design brief. The designs are intended to address the identified client's needs and key features in 'a' and the specifications which were subsequently developed in 'b' and 'c', not the opinions of their peers, or others.

*Marks available for quality of written communication are built into Expected Evidence requirements.

Section 3: Assessment information

e) Testing and selecting the final solution*

Mark range 1–2	Mark range 3–4	Mark range 5–6
Limited testing against the design criteria in order to select and outline the final design solution. Written evidence is poorly presented with little use of appropriate terminology.	Use of a range of testing against the design criteria in order to select and describe the final design solution. Written evidence is generally free of errors and terminology is mostly used accurately and appropriately.	Objective testing against the design criteria in order to select and justify the final design solution. Written evidence is clear, with consistent use of spelling or punctuation and grammar and there is good use of accurate terminology.
Expected evidence	Expected evidence	Expected evidence
<p>Records, possibly including photographs, of limited testing against the design criteria, or simple checklist or score sheet (1).</p> <p>Brief statements indicating how the final chosen design solution meets the main requirements (1).</p>	<p>Mostly clear records, mostly free of errors, with accurate use of appropriate terminology:</p> <ul style="list-style-type: none"> • showing a range of testing techniques carried out against the design criteria in the specification and the client's needs (2) • describing how the final chosen design solution best meets all the main requirements of the client, with reference to the specification (2). 	<p>Clear records, with consistently good spelling or punctuation and grammar and good use of accurate terminology, of:</p> <ul style="list-style-type: none"> • objective testing against the design criteria to give some measurable outcomes (3) • selection and justification of the final chosen design solution against the design criteria, client needs and specification (3).
<p><i>Limited testing</i> may be subjective scoring of the design ideas against some of the design criteria.</p> <p><i>A range of testing</i> should include a number of different tests, e.g. models, different prototype circuit arrangements, mock-ups to check clearances, calculations to test load-bearing, strength, capacity, water-resistance, etc (depending on the artefact).</p> <p><i>Objective testing</i> should employ appropriate testing of developed prototypes, using measurements on different variations or design ideas in order to select and justify. Could include material constraints from 'b' or issues of manufacture from 'c', etc.</p> <p>Candidates must state clearly which design solution they have chosen and why the chosen design meets the design criteria, perhaps scoring each design against a range of design criteria as ticks, then counting the ticks to select, or numerical scores.</p>		

Section 3: Assessment information

f) Prototype

Mark range 1–2	Mark range 3–5	Mark range 6–8
Selection, with support and guidance, of some appropriate processes, tools and equipment, using them safely, with some skill to make a prototype.	Selection, with limited support and guidance, of some appropriate processes, tools and equipment, using them safely, with skill to make a prototype.	Independent selection of appropriate processes, tools and equipment, using them safely, with skill and accuracy to make a prototype.
Expected Evidence	Expected Evidence	Expected Evidence
<p>Documented evidence identifying a limited range of appropriate processes, tools and equipment:</p> <ul style="list-style-type: none"> selected to manufacture the prototype (1) used with some skill, in a safe manner (1). <p>Support and guidance needed to select and use processes, tools or equipment.</p>	<p>Documented evidence identifying a range of appropriate processes, tools and equipment:</p> <ul style="list-style-type: none"> selected to manufacture the prototype (2) used with skill (2) in a safe manner (1). <p>Limited support and guidance may be provided, except as mentioned below.</p>	<p>Documented evidence identifying all appropriate processes, tools and equipment:</p> <ul style="list-style-type: none"> selected to manufacture the prototype (2) used with skill (2) and accuracy (2) in a safe manner, independently (2). <p>No support or guidance required, except as mentioned below.</p>
<p>Note: avoid 'judgemental or evaluative statements'. For candidates, and witness statements, it is essential to include real details; saying 'appropriate tools', etc, or 'worked skilfully and safely', is not reporting or stating what was witnessed. Annotated photo evidence is an excellent method of evidencing this, due to the availability of cheap cameras. Mobile phone cameras may lead to unwanted and derogatory 'social media' uploading, so care is advised.</p>		
<p><i>Documented evidence</i> can include witness statements and annotated photographs.</p> <p>Note: support and guidance may be provided to any candidate where health, safety or welfare could be at risk, bearing in mind that they have had little experience of the use of materials, tools, equipment and/or machinery.</p> <p>Some centres allow candidates to create a prototype for each design solution. Although not wrong, there are no extra marks for creating more than one, and using the prototypes to help inform judgements at 'e'. Although the time spent making may be enjoyable, centres have to ensure that candidates do not spend too much time making, depriving them of the time required for the rest of their portfolio work. This decision should be based around the product(s) being designed, keeping within the 23–33 hours total assessment/portfolio time.</p>		

Section 3: Assessment information

g) Presentation techniques

Mark range 1–2	Mark range 3–4	Mark range 5–6
Selection and use of a limited range of techniques to present the final solution.	Selection and use of a range of techniques to present, in some detail, the final solution.	Selection and use of an appropriate range of techniques to present, in detail, the final solution.
Expected Evidence	Expected Evidence	Expected Evidence
Some documented evidence or statement describing how a limited range of presentation/communication techniques were selected (1). Evidence that the presentation was carried out with some skill, but with a limited range of techniques (1).	Documentary evidence or clear statement explaining how a range of presentation/communication techniques were selected (2). Evidence that the presentation was carried out skilfully and in some detail (2).	Clear evidence or thorough statement justifying how and why the range of presentation/communication techniques were selected (3). Evidence that the presentation was carried out effectively and in detail (3).
<p>Candidates must state why they chose specific presentation techniques from the following range: annotated sketches, photographs and ICT-generated drawings, samples and swatches, technical drawings and diagrams, written material, spoken presentations, mock-ups, models and prototypes. There is no fixed number required to meet the higher bands, but most probably more than three techniques (spoken, written and sketches). In order to meet the highest mark band, all aspects of the design solution must be clearly described, explained and illustrated.</p> <p>Evidence of clarity of presentation and degree of skill demonstrated will most probably be presented in the form of witness testimony, including annotated photographs. PowerPoint slides or handouts, or similar, should be included along with any 'prompt notes' and explanation/justification of techniques used by the higher scoring candidates.</p> <p>Note: a witness testimony must record what was witnessed, avoiding the inclusion of subjective, judgmental or evaluative statements. For example, saying what the candidate did, not how well the observer thought s/he had done it.</p>		

Section 3: Assessment information

h) Final review*

Mark range 1–2	Mark range 3–4	Mark range 5–6
Limited description of how the final design solution meets the client design brief and design specification, with an identification of some relevant modifications. Written material is poorly presented with little use of appropriate terminology.	Description, in some detail, of how the final design solution meets the client brief and design specification, describing relevant modifications. Written material is generally free of errors and terminology is mostly used accurately and appropriately.	An explanation, in some detail, of how the final design solution meets the client design brief and design specification, explaining relevant modifications. Written material is clear, with consistent use of spelling and punctuation and grammar and there is good use of accurate terminology.
Expected Evidence	Expected Evidence	Expected Evidence
Portfolio serves as a presentation document with limited description of how the final design solution meets the client brief and design specification (1) some modifications identified (1).	Portfolio serves as a presentation document, being generally free of errors and appropriate terminology being mostly used accurately and appropriately, describing in some detail: <ul style="list-style-type: none"> • how the final solution meets the brief (2) • relevant modifications described (2). 	With consistent use of spelling, grammar, punctuation and good use of accurate terminology throughout the majority of the portfolio, provides detailed explanation with high quality of presentation (3). Relevant modifications are explained clearly and accurately (3).

Note: teacher/other can act in a client role to receive the portfolio (as a design solution presentation document) and offer relevant suggestions for improvements or modifications.

For all mark ranges, candidates need to produce a separate description or detailed explanation of how the final solution meets the brief, including details of any earlier modifications, adding these to the portfolio to form the presentation document for submission to the client or proxy.

Following the presentation, which need not be a verbal one (it could be a display or a series of posters or annotated photographs), the candidate needs to identify and describe/explain further modifications which would be made following the client's feedback.

A well presented portfolio will have a contents page or other means of indicating the location of the evidence for each of the assessment criteria from 'a' to 'h'.

* Marks available for quality of written communication are built into Expected Evidence requirements.

Section 3: Assessment information

Unit 2: Manufactured products

a) Work as part of an effective team

Mark range 1–2	Mark range 3–4	Mark range 5–6
Contributed to the work of an effective team, and success in meeting some targets.	Helped build an effective team, and success in meeting key targets.	Played a leading role in ensuring that the team worked effectively and success in meeting all achievable targets.
Expected Evidence	Expected Evidence	Expected Evidence
Likely to include witness testimonies to some extent, candidates must demonstrate some contribution to the work of the team (1). Records indicating some individual and/or team targets were met (1).	Candidate's report and witness testimonies providing description of candidate's active team role(s) which helped to ensure that the team worked effectively (2). Records indicating that the key individual and team targets were met (2).	Candidate's report and witness testimonies providing clear description of how the candidate's leading role/activity ensured that the team worked effectively (3). Records indicating that the candidate met all achievable individual and team targets (3).

Note: this unit is about making products in a manufacturing setting. There is no design in this unit.

Evidence of the role(s) for each candidate may be provided by the candidate's own account, by peer group assessment/review or witness testimony provided by the assessor or observer. A candidate does not need to work consistently at the higher level in order to receive this recognition, nor does s/he have to be an elected leader, but some aspect of their activities must be considered to have demonstrated an element of leadership throughout the team activities. In order to meet the second feature of this criterion it is important that clear records of target setting and achievement are provided. These targets should be related to the production targets. Team Building and Motivation are not considered to be related to production targets.

Minutes/notes from meetings can also prove useful to evidence aspects for this criterion.

Witness statements are most effective when they quote 'contributed to the team', 'helped build an effective team' or 'played a leading role...', etc, because they indicate the relevant mark band. There should be evidence in the portfolio to support the comments made in any witness statement.

When allocating/choosing team roles, the roles should reflect aspects of the product manufacture and avoid formal titles as may be used in industry such as Health and Safety Manager, Quality Advisor, etc, as this can detract from the completion of all the assessment criteria.

Section 3: Assessment information

b) Produce a schedule for manufacture*

Mark range 1–2	Mark range 3–4	Mark range 5–6
Use of some details within a production plan and product specification, and the development of an outline schedule for manufacture. The schedule contains frequent spelling errors and grammatical mistakes and there is little use of appropriate terminology.	Use of the main information within a production plan and product specification, and the development of a realistic schedule for manufacture. The schedule is generally free of errors and terminology is mostly used accurately and appropriately.	Confident use of the main information within a production plan and product specification, and the development of a detailed and effective schedule for manufacture. Schedule is clear with few, if any, spelling or punctuation mistakes and there is good use of accurate terminology.
Expected Evidence	Expected Evidence	Expected Evidence
<p>With some guidance and support, the candidate will provide basic statements identifying the details taken from the production plan and product specification (1).</p> <p>An outline but understandable schedule for manufacture, addressing most key stages, should be produced (1).</p>	<p>With limited guidance and support, the candidate will make informed decisions of how products should be made based on the details of the production plan and product specification. The schedule for manufacture will contain very few errors and terminology will be used accurately in most cases (2).</p> <p>A realistic, almost error-free schedule for manufacture should be produced, which could be followed by a third party (2).</p>	<p>The candidate will independently make effective decisions of how products should be made based on the details of the production plan and product specification and the schedule for manufacture will be clear, with almost no errors in grammar, spelling or punctuation and the terminology will be used accurately throughout (3).</p> <p>An effective, potentially error-free schedule for manufacture should be produced, allowing consistent use by others (3).</p>
<p>An important element of this criterion would be provided by witness testimony relating to level or amount of guidance and support required and the amount of input provided to the generation of the team schedule.</p> <p>The schedule may be a team effort but individual input must be recorded, and assessed for each individual. It may be helpful to encourage all candidates to produce their own schedule for discussion by the team to help produce a team schedule. Used together, the candidate's own and the final team schedule would make appropriate evidence of contribution, allowing individual assessment in each portfolio.</p> <p><i>The Schedule for Manufacture:</i> this is generated by the candidate using the two items issued by the teacher/centre – the product specification and the detailed production plan. These should be designed to allow every subsequent assessment criterion to be addressed, as appropriate, and the production plan for making one item should then be developed by the candidate into a schedule for making a number of the same item.</p> <p>In order to meet MB2 the schedule must be capable of being followed by a third party. In order to meet MB3 the schedule would include: all preparation and assembly stages, health and safety, PPE, sequence and timing of stages, critical production and quality control procedures, production and quality control procedures, allocation of roles and responsibilities, and consideration of how the product can be made most effectively. This might be</p>		

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demonstrated by ensuring that all team members are fully employed. The schedule does not need to be perfect and most probably will be modified as the result of experience – actually gaining marks for assessment criterion 'h'. Any planning is a 'best guess' and, for instance, timings may be different from original estimates. The important thing is to glean the details from the production plan and product specification issued by the teacher.

*Marks available for quality of written communication are built into Expected Evidence requirements.

Note: quality of written communication is assessed in this criterion, therefore a Gantt Chart will not be adequate evidence. Generally a table with 5 to 8 columns to include the points outlined in the specification on pages 20 and 21 is required. Reference will be made to a range of entries (such as health and safety, PPE, materials, tools, timings, etc) and it is expected that separate written material will be generated to explain these points in the schedule.

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c) Prepare and use materials

Mark range 1–2	Mark range 3–4	Mark range 5–6
Preparation, with guidance, of materials and components, according to some relevant production criteria, using materials safely with some skills to make a product.	Preparation, with limited guidance, of materials and components, according to the main production criteria, using materials safely with skill to make a product.	Independent preparation of materials and components, according to all relevant production criteria, achieving optimum and safe use of materials when making a product.
Expected Evidence	Expected Evidence	Expected Evidence
<p>With support and guidance, the candidates should provide evidence of preparation of some materials and components in a manner which is relevant to some of the production criteria (1).</p> <p>With support and guidance, evidence of working safely with some skill (1).</p>	<p>With limited or occasional support and guidance, the candidates should provide evidence of preparation of materials and components according to the main production criteria (2).</p> <p>Evidence of working safely and demonstrating a range of skills (2).</p>	<p>Working with no support or guidance, the candidates should provide evidence of preparation of materials and components according to all relevant production criteria (3).</p> <p>Evidence of consistently working safely and achieving optimum results through the use of skills (3).</p>
<p>Note: whether the controlled assessment is carried out using long sessions, or normal lesson times, careful consideration must be given to how candidates will evidence their preparation and use of materials. Preparation is obviously the first activity, and spending some time to ensure a range of photographs of each candidate are taken and distributed for use in their portfolios has proved to be of great assistance in some centres.</p> <p>Using materials invariably merges 'c' and 'd' (use of tools and equipment) together, but encouraging candidates to sequence these, as far as possible, within their portfolios will reap benefits when it comes to assessment, and moderation.</p>		
<p>The support and guidance can be evidenced in the candidate report or by use of witness testimonies, and can include photographic evidence, including annotated photographs. The range of materials and components will depend on the product, and the initial choice of product should ensure a broad enough range will be included to fully address all the mark bands.</p> <p>The recording of 'use of skills' can again be covered by witness testimonies, but annotated photographs would make effective inclusions in each candidate's report. The quality requirements should have been met, and for the highest mark range, consideration of minimising material/component waste should be included.</p>		

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d) Prepare and use tools, equipment and machinery

Mark range 1–2	Mark range 3–4	Mark range 5–6
Preparation, with guidance, of tools, equipment and machinery, using them safely with some accuracy and skill to make a product.	Preparation, with limited guidance, of tools, equipment and machinery, using them safely with accuracy and skill to make a product.	Independent and precise preparation of tools, equipment and machinery, using them safely with accuracy and skill to make a product.
Expected Evidence	Expected Evidence	Expected Evidence
With support and guidance, the tools, equipment and machinery will be appropriately prepared for use (1). Processes and procedures will be carried out safely, with some degree of skill and accuracy being demonstrated (1).	With limited support and guidance, the tools, equipment and machinery will be skilfully prepared for use (2). Processes and procedures will be carried out safely, and with regular demonstration of skill and accuracy (2).	Working without support and guidance, the tools, equipment and machinery will be prepared with precision (3). Processes and procedures will be carried out safely, with skill and accuracy being demonstrated at all times (3).

Note: as mentioned at 'c', preparation of tools, equipment and machinery will generally come before using them, so 'c' and 'd' may merge together in a realistic practical activity. Collection and presentation of evidence, though, should ideally be separated and sequenced to match the flow of the assessment criteria through 'c', then 'd', as far as possible. If not, effective annotation and subheadings are essential.

Candidate report and witness testimony will be required to evidence this criterion effectively. The support and guidance can include photographic evidence, including annotated photographs. The range of materials and components will depend on the product, and the initial choice of product should ensure a broad enough range be included to fully address all the mark bands. It is essential to select a product which provides a range of challenges to all candidates, allowing the less able candidate to succeed, accordingly, whilst providing sufficient demands for skill and precision to be demonstrated at the higher level.

The recording of use of skills can again be covered by witness testimonies, but annotated photographs would make effective inclusions in each candidate's report. The quality requirements should have been met, and for MB3, consideration of minimising material/component waste should be included.

Where a candidate manufactures items which do not fully meet the quality points, such as dimensions, etc, s/he is not deemed to have worked 'skilfully' with 'accuracy' and should be awarded marks which are representative of the performance, not the expectation.

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e) Manufacture products to meet requirements

Mark range 1–2	Mark range 3–5	Mark range 6–8
Safe manufacture of products, to meet some client requirements and conform to some required quality standards.	Safe manufacture of products, to meet the main client requirements and conform to the main required quality standards.	Safe manufacture of products, to effectively meet the main client requirements and consistently conform to the main required quality standards.
Expected Evidence	Expected Evidence	Expected Evidence
Safe manufacture of products which meet some of the client's requirements (1). Some evidence of conforming, even partially, with some quality standards (1).	Safe manufacture of products which meet the client's main requirements (3). Conforming with the main quality standards (2).	Safe manufacture of products to effectively meet the client's main requirements (5). Consistently conforming to the main quality standards (3).

Note: if a witness statement states that a candidate produced 15 items on a lathe and they were all within the tolerance of 0.1mm in diameter that is acceptable as long as there is supporting evidence in the quality checks carried out by the candidate. Where both are evident full marks may be deserved, but where the witness statement is not supported by portfolio evidence, then a fair assessment is that 'some evidence of conformity' was produced (the witness statement) which will result in the award of 1 or 2 marks only.

It is important that candidates provide clearly documented records of quality checks, in accordance with the schedule for manufacture and other documentation.

It is important that centres provide candidates with clearly measurable quality indicators which identify the degree of accuracy required. Often this is in the form of tolerances, e.g. in lengths, diameters, sizes, weights, operation speed/frequency, etc. This must be provided in the product specification and production plan detail, issued to candidates before they start. The centre report or witness statements should note any failure by individuals in meeting this requirement.

Limited testing may include the use of procedures such as go/not go or pass/fail gauges, templates and jigs. More accuracy, where relevant, can include the use of micrometers or vernier gauges. Actual measurements and tolerances will depend on the products being made: engineering or CNC production should work to fractions of millimetres, whereas food products cannot be produced with such precision or accuracy but a finished product could be within +/- 5 or 10g. Similarly, card or paper products being cut to, e.g. A4, A5, A6 sizes, should relate to the BS, DIN, JIS or ISO standards relevant to that industry (as indicated by a quick Internet search). These can be measured at quality checks using jigs or rules.

Centres should avoid providing a 'one I made earlier' prototype for comparison with the production artefacts. This type of checking does not identify the degree of accuracy and may disadvantage the candidates. Critical Quality Indicators should be clearly stated at the start in the product specification. It should not be left for the candidates to determine what level of quality is required by comparison with a prototype. It is acceptable, where appropriate, to provide candidates with quality indicators such as colour charts, etc, as appropriate to cooked products, for instance.

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f) Monitor production

Mark range 1–2	Mark range 3–4	Mark range 5–6
Simple monitoring of production activities.	Monitoring and recording progress of manufacturing activities.	Detailed and consistent monitoring of production activities in order to maintain production.
Expected Evidence	Expected Evidence	Expected Evidence
Carries out basic checks to compare the actual production processes, timings, etc, against the planned schedule for manufacture (1). Witness testimony, photographic evidence or brief comments to demonstrate the comparisons (1).	Carries out the main relevant checks to compare the actual production processes, timings, etc, against the planned schedule for manufacture (2). Provides some detail in the form of a report or other evidence to explain the comparisons made (2).	Carries out all necessary checks to compare the actual production processes, timings, etc, against the planned schedule for manufacture (3). Provides detailed report to justify the results of the comparison (3).

Note: monitoring the rate of production or the timings of each stage of manufacture can be used to improve or amend the schedule for manufacture, if possible. It can also be used to help decide how to save more time to make the products more quickly, with fewer steps – the basis of time and motion study and lean manufacturing.

During the production/manufacturing processes, it may help to take photographs for candidates to use within their portfolios to demonstrate that they have carried out checks as they monitor the production flow, or they could write about it. Monitoring production helps to identify activities which are wasting time or which could be improved, e.g. where operators are standing idle, waiting for work to come their way. They could even be video recorded and spend time analysing this, if time permits, or simply have someone standing there observing them, timing every action using a stop watch. The timings observed could then be compared to the planned timings on the schedule for manufacture, allowing real evidence to be used to gain marks in 'h' as well.

Whichever sector of manufacturing is being studied, production monitoring always takes place, and the generation of this evidence is required for section 'f', and comparing the recorded times with those initially planned. Witness testimonies describing the actions taken are also acceptable, but centres are advised not to make judgmental comments only, such as 'a very thorough range of checks was made safely and effectively' as this cannot be agreed or re-assessed by a remote moderator. It is better to say exactly what was done, then the moderator can decide whether it was done effectively and thoroughly or not, and provide guidance to help improvements for the next series.

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g) Use quality control techniques

Mark range 1–2	Mark range 3–4	Mark range 5–6
Limited use of quality control techniques to monitor production and identify problems.	Use of a range of quality control techniques to monitor production and describe the causes of problems.	Use of objective quality control techniques to monitor production and explain how to prevent problems happening again.
Expected Evidence	Expected Evidence	Expected Evidence
Limited evidence of using some aspect of quality control techniques: <ul style="list-style-type: none"> to monitor the quality of the produced artefact (1) to identify problems or potential problems (1). 	Evidence of using a range of appropriate, and planned, quality control techniques: <ul style="list-style-type: none"> to monitor the quality of the produced artefact (2) to describe problems or potential problems (2). 	Evidence of using objective quality control techniques: <ul style="list-style-type: none"> to monitor the quality of the produced artefact (3) to explain the prevention of problems or potential problems (3).

Note: it is essential that candidates complete accurate records of data checks and quality monitoring details for use in their portfolios.

Marks awarded for this criterion should have coherence with those given for previous criteria, and reflected in 'h'. As the portfolio shows progress from 'a' to 'h', a more complete picture of the manufacturing processes and activities should become clear.

Witness testimony to support the completion of production checklist/inspection sheet(s) may prove helpful, supported by the real evidence – the checklists.

Inspection sheets show that product quality has been checked, and responded to, with some skill and accuracy. However, without details of standards and the expected quality, with tolerances, being provided in the original production plan and product specification, the candidates can only second guess what may be needed, at best.

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h) Modify production plan and schedule for manufacture

Mark range 1–2	Mark range 3–4	Mark range 5–6
Modifications in response to quality data, some of which are relevant and lead to the improvement of some aspect of the production plan and schedule for manufacture.	Modifications in response to quality data, most of which are relevant and lead to the improvement of several aspects of the production plan and schedule for manufacture.	Modifications in response to quality data, all of which are relevant and lead to the improvement of significant aspects of the production plan and schedule for manufacture.
Expected Evidence	Expected Evidence	Expected Evidence
Use of some quality data leading to limited potential improvement in: <ul style="list-style-type: none"> the production plan (1) the schedule for manufacture (1). 	Use of relevant quality data leading to improvement or potential improvement in several aspects of: <ul style="list-style-type: none"> the production plan (2) the schedule for manufacture (2). 	Use of relevant quality data leading to improvement or potential improvement in significant aspects of: <ul style="list-style-type: none"> the production plan (3) the schedule for manufacture (3).

Note: this criterion requires the products to have been manufactured and tested after having gone through the whole process of manufacture to allow an overall assessment review of the materials, tools, equipment and processes to be evaluated against the product specification, the detailed production plan and their own schedule for manufacture.

Then, the candidate has to suggest modifications to any or all of the steps from start to finish, which have the potential to improve some aspects of the product manufacture.

Finally, as well as suggesting a range of modifications and improvements to the process, the production plan and manufacturing schedule need amending (or preferably replacing with an updated version) allowing the candidate to demonstrate their overall grasp of the processes involved with managing the manufacturing a number of products.

If a candidate or a team arrive at a point where they can find no way of improving their process, which is unlikely but possible, they could always be asked to suggest amendments which would reduce the cost of production by 10%, which may lead to sourcing cheaper supplies, reducing production time, etc. This is all part of the introduction to real manufacturing processes.

A well presented portfolio will have a contents page or other means of indicating the location of the evidence for each of the assessment criteria from 'a' to 'h'.

FAQs: Preparing to teach controlled assessment

Before you can plan your teaching, you will need to have an idea of how the controlled assessment is to be assessed and what candidates have to do. Here are some important answers to frequently asked questions about controlled assessment.

What is controlled assessment?

Controlled assessment has replaced coursework and is the new form of internal assessment required when assessing GCSE Manufacturing internally assessed units.

The main difference between the previous style of assessment of coursework and controlled assessment is that assessment activities for Units 1 and 2 must now be undertaken using various levels of control that were not previously in place.

There are three elements attached to controlled assessment and these are task setting, task taking and task marking and these elements are subject to varying levels of control.

When can I offer the controlled assessment unit?

Candidates must submit their completed activities for controlled assessment in the summer series at the end of the year. However this does not prevent candidates from being assessed much earlier in the course provided completed assessments are retained securely at the centre premises before submission by 15th May of the final assessment year. Effectively, whenever the teachers feel that the candidates have been taught all they need and teaching and learning has been completed, controlled assessment can start.

Can I start controlled assessment in Year 9?

Controlled assessment can be done at any time. Some centres start early and move on to other qualifications after an early finish.

When will I be able to access the task?

The controlled assessment task for each unit is published on the subject page of the Edexcel website: www.edexcel.com/quals/gcse/gcse09/manufacturing.

They are subject to review every two years.

The controlled assessment tasks for Unit 1 and Unit 2 will be published on Edexcel's website each September. Teachers will need to contextualise these tasks to ensure that the activities undertaken meet local needs and can also be undertaken with the resources available in individual centres.

Teachers can no longer give candidates an open choice or make suggestions regarding what they would like to do for a final GCSE project. From now on, controlled assessment tasks will be set by Edexcel and must be selected from, as starting points for projects. The level of control attached to Task Setting is 'high'. However, although the scenario can be changed to suit local needs and resources, the actual controlled assessment tasks or activities set by Edexcel must all be completed as specified due to the high level of control deemed necessary.

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When can candidates see the task?

You can give candidates the tasks whenever you feel they are ready. You may feel it is more appropriate to provide the controlled assessment task activity by activity, i.e. start with the 'design' activity or the 'make' activity. Ideally the candidates will have had a substantial period of teaching about the core content and opportunities to collect primary and secondary evidence before they complete the controlled assessment tasks. That way, timings can be controlled and the portfolios should be developed with a clear sequential structure.

Can I set homework as part of controlled assessment?

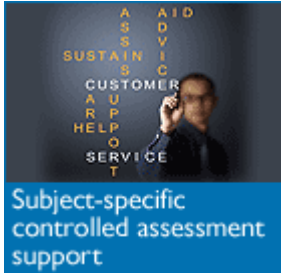
As part of controlled assessment, homework can be set, as long as the majority of work is done under medium levels of control and homework can be guaranteed by a teacher to be the exclusive work of an individual candidate. It could include research or the development of parts of their design ideas – provided the teacher can confidently accept it as the work of the candidate, this fits the understanding of 'under limited supervision'.

Can candidates use ICT at home to do some of their write-up?

ICT can be used at home to do some of the write-up as long as a draft version of the work to be produced is done under medium controlled conditions and is seen by a teacher. The completed work should be checked by a teacher to ensure that it matches the draft and can be guaranteed as that of the candidate. Similarly, some schools operate 'after school activities' including ICT access groups, and as long as the medium control is assured, some candidates may benefit from such access to limited ICT provision.

Supporting you with controlled assessment

Need help with controlled assessment? Our experts are on hand to support you...



Email the subject team directly at TeachingManufacturing@pearson.com.

Call 0844 463 2824 to speak to a member of the manufacturing team.

Ask the Expert, our free email service, puts you in direct contact with a senior examiner who will help answer any subject-specific questions concerning the teaching of manufacturing. They will email you within two working days of receiving your question.



You can find all the documents relating to controlled assessment below (as well as on the main GCSE Manufacturing page).

You should also refer to the JCQ controlled assessment guidance document.

