

Moderators' Report/
Principal Moderator Feedback

Summer 2013

Principal Learning

Manufacturing and Product Design
Level 1 Controlled Assessments

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Introduction

In this series all of the available units for the Level 1 Principal Learning in Manufacturing and Product Design were offered for moderation and award. Entries were received for internally assessed units MP102, MP103, MP104, MP105 and MP106.

The majority of students were able to perform to an appropriate standard with marks being gained across the whole range of learning outcomes.

Administration was generally good, with the correct samples being provided. Most Candidate Record Sheets (CRS) were correctly completed with full student details and marks. Most student work was organised in such a manner that it was straightforward for the moderators to locate the evidence for each Learning Outcome.

It should be noted that guiding the moderator to specific pages where students work has been credited helps the moderation process. Where the moderator cannot follow the assessment processes and decisions a center has made there is an increased potential for the moderator to disagree with the marks awarded by the center.

There was some evidence of work being included in the students' portfolios that did not contribute to the assessment process. As such it would be helpful for centres to remove this material before submitting the work.

Unit MP102_1A

Dealing with Customers and Suppliers in Manufacturing

General comments

There was evidence of centres delivering this unit by considering how local manufacturing businesses operated. The use of real life situations appears to motivate students and is to be encouraged wherever possible.

Learning Outcome 1 (Marking Grid A)

In this criterion students are required consider the importance of customer service procedures such as forming good relationships. For students performing within mark band 1 it is sufficient to indicate, ie point out, their importance. The use of case studies may help students access the content of this unit. Centres might consider the use of training videos to bring to the attention of their students various aspects of customer service.

Learning Outcome 2 (Marking Grid A)

For this criterion students need to consider how employees add value to an organisation. For students operating within band 1, multiple choice tests, completing sentences with missing words or matching terms to their definitions would all be appropriate methods to provide evidence of completing the criterion. For students performing within band 3 there should be evidence of work being produced with greater independence.

Learning Outcome 3 (Marking Grid A)

For this criterion students need to consider the legal and ethical issues. The comments for learning outcome 2 could be applied equally for this component to provide evidence for band 1. The Times 100 provides a case study titled 'Primark - Providing consumers with ethically sourced garments'. This sets the subject in a context that many students will be familiar with. The information is presented in a manner that is accessible to secondary school students.

Possible content for an A* assignment

Below is an indication of what a centre might encourage students to present as evidence for this unit. It is not a definitive list, simply an indication of what might be included.

At level 1 A* grade students are likely to be able to construct and organise, with a degree of independence, their own format of evidence.

Learning Outcome 1 (Marking Grid A)

Students could make comments that consider how several aspects of customer service are important to the company, internal customers, external customers and suppliers. There would not be a great deal of depth to the judgements made but there would be coverage of several elements from each of the three sections.

Learning Outcome 2 (Marking Grid A)

Students could make brief comments that describe at least four of the following aspects; meeting deadlines, flexible working, team working, delivering good customer service and suggesting improvements. These may be supported with examples taken from case studies. For each of the aspects they could make simple statements about how these add value to the business.

Learning Outcome 3 (Marking Grid A)

Students could describe several of the main features of three different laws that apply to a particular sub-sector of manufacturing. They could offer short descriptions of the ethical considerations related to environmental effects and social responsibility.

They could list several of the main rights provided to the consumer by the sale of goods act. They could then illustrate how these would be applied for the benefit of the consumer. These may take the form of case studies that illustrate how the consumer can use laws to support them when dealing with suppliers of goods or services.

Learning Outcome 4 (Marking Grid B)

For both parts the assessor could provide a witness statement that the student has taken part in a role play exercise. This may be supported by photographic evidence. The student could make simple statements about how their own contribution was a key role in the activities undertaken. The student may assess their own performance.

Students may have taken part in at least two different role play activities dealing with a customer and a supplier.

Unit MP103_1A

Introduction to Working Practices in Manufacturing

General comments

There was evidence of centres taking students to visit employers to set the context of this unit in realistic working environments. This enhances student experience and is a very useful technique.

Learning Outcome 1 (Marking Grid A)

A range of styles of work were submitted for assessment. Where students were provided with headings for a written report the full range of marking criteria were more frequently covered. Diagrams were often a successful method of indicating the links between different departments.

The responsibilities of employers and employees tended not to be undertaken particularly well. This was due to several factors, including only considering either the employer or employee. In future series, centres may wish to provide students with templates that have separate headings for employer and employee responsibilities.

Learning Outcome 2 (Marking Grid A)

Most students produced materials that referenced specific aspects of health and safety legislation, such as the need to wear goggles, rather than refer to the acts of law that require their use.

Centres might consider the use of matching exercises in order to supplement student evidence for the criterion. For example students could be provided with the names of three relevant key laws, such as the environmental protection act. They could then be given descriptions of a number of problems and be required to link the law which would be relevant to each problem. Centres could adjust the level of demand of the task to suit their particular cohort.

Learning Outcome 1 (Marking Grid B)

The marking grid for this criterion is split into two parts, but centres frequently gave a combined mark for both sections. This practice should be avoided in future series.

Where students reviewed their performance as a member of a team, moderators were clearly able to understand the grading decisions made by centre assessors. Some centres provided witness statements which again supported the marks awarded. Templates for witness statements are available from the Edexcel website.

There were a full range of marks awarded to students. This supports the accuracy of teacher assessment given the probable wide range of student abilities that submitted evidence for this unit. In future series, centres may wish to encourage all students to review their own performance.

Possible content for an A* assignment

Learning Outcome 1 (Marking Grid A)

Students will base the submission around a manufacturer from a sector they are familiar with. For example if they have undertaken practical work in the production of food products, they will consider a food manufacturer.

Students will begin by describing the function of different areas such as sales, production and maintenance departments. This may take the format of describing how a typical task for each department starts, what they do with the task and how they know the task has been completed.

From this overview of the departments, specific job roles in each department would be considered.

A diagram would then be produced that illustrates how the different departments / jobs in the organisation interact with each other.

For the second component of the learning outcome students will produce a table that describes the responsibilities that employers and employees have towards each other.

For example:

Employer	
Responsibility	Description - The employer will:
health and safety requirements	Provide free of charge appropriate PPE Ensure all tools and equipment used comply with appropriate safety standards.
Staff training	
employment contract	
anti-discrimination policies	

Employee	
Responsibility	Description - The employee will:
health and safety training	Use PPE provided Use tools and equipment in the correct way
attendance	
punctuality	
positive work ethic	

Learning Outcome 2 (Marking Grid A)

A similar table to that produced for LO1 would provide structure for students to enter descriptions of the relevant health and safety and environmental legislation related to a specific manufacturing sector.

A possible approach to producing evidence relating to codes of conduct would be to provide students with an existing code of conduct from a relevant employer. Using this as a starting point, students would then add their own descriptions of what the requirements mean and why they are important.

For the third and final element of this learning outcome the specification gives examples such race, culture, national origin, region, gender, sexual orientation, age, marital status, politics, religion, ethnicity, disability. Students could provide statements about what employers are expected do in order to ensure compliance with relevant legislation. An approach that either considered two of these aspects in depth or four in less depth would be suitable.

Learning Outcome 3 (Marking Grid B)

It is important that that the teamwork task students undertake is of sufficient complexity to allow them to demonstrate they can work independently towards goals, behave responsibly, organise time and show flexibility.

They must also be able to demonstrate how they contribute to effective and safe team working. Observation records, photographs, video recording or student diaries would probably be combined to provide evidence to support the award of marks allocated to this section.

Unit MP104_01

Introduction to Product Design and Development

General comments

The quality of work students can submit for this unit is directly related to the quality of the brief they are provided with by their center. Where marks are awarded by centres for Marking Grid A outcomes, it is essential the moderator can see the evidence of the work that gained credit. In this examination series there were some instances where centres did not provide this evidence.

Progression from the lower to higher mark bands is achieved through students demonstrating more in-depth solutions to problems, not simply increasing the quantity of work they produce. Students are more likely to access the higher mark ranges by concentrating their efforts on a single design task, rather than quickly working through multiple ones.

Learning Outcome 1 (Marking Grid A)

This criterion requires students to review the needs of a client brief. The quality of the brief is therefore very important. Where centres provided students with a simplistic brief the students were not able to access the higher marks. Centres should ensure that the brief contains sufficient information to allow students to produce work at the band 3 level. Centres may wish to provide students with an electronic editable version of the brief that will allow them to add their reviews directly underneath each of the key features.

Learning Outcome 2 (Marking Grid A)

For this criterion students should provide evidence that they have investigated a range of potential materials. This should be supported with reasons for choosing particular materials to use in their design proposals. Centres might consider using a 'scoring' approach to the properties of range of materials. This would provide students with a method to select materials based on objective criteria.

Learning Outcome 3 (Marking Grid A)

The specification provides a range of examples of the issues that manufacturers could consider when designing a product. These include market for product, legislation, costs, aesthetics, customer and client needs and sustainability. Students need to describe at least two of these factors. This section tends not to be completed well by students. There may be a need for centres to focus student activities towards generating evidence explicitly linked to this requirement.

The second part of the learning outcome has the focus of CAD/CAM and how these could be used in their product design. Most students were able to produce valid evidence to support the award of marks in the middle to higher bands.

Learning Outcome 4 (Marking Grid A)

This criterion has 2 components, the first covers research and design, whilst the second covers the PDS and modifications to the design.

A possible starting point for the research would be to consider existing products similar to that required by the client brief. For students working within band 1

collecting images may be appropriate. As students progress to band 3 these images could be considered and commented upon.

Students are assessed on the designs they produce. When this unit is delivered in conjunction with unit MP106 -making a product, care should be given to ensure the evidence provided is about the designs, not the artifacts produced. The design process should result in a working drawing.

Students should then seek the feedback of another person or persons to comment on their PDS. A simple market research style survey may be an appropriate technique for this. For students performing within band 1 it may be appropriate to provide them with prepared set of questions to ask about their proposal. As students progress towards band 3 these supportive structures should be reduced, allowing greater autonomy.

This feedback should then be used to generate modifications to the design proposal.

Explicit evidence of the modifications to design proposal should also be included.

Possible content for an A* assignment

Below is an indication of what a centre might encourage students to present as evidence for this unit. It is not a definitive list, simply an indication of what might be included.

Learning Outcome 1 (Marking Grid A)

Students could review and explain the importance of function, styling aesthetics, performance, intended markets, size, timescales, cost, and anticipated quantities. They could go on to make notes about how these considerations will be developed into a PDS.

Learning Outcome 2 (Marking Grid A)

Students could produce a list of several materials suitable for the product required by the client brief. They could make statements about why the materials would, or would not, be suitable.

Learning Outcome 3 (Marking Grid A)

Students could make statements that describe the market for the product, laws that relate to the product, manufacture, logistics and appearance. They could then go on to describe ways that CAD and CAM could be used in the design and manufacture of the product.

Learning Outcome 4 (Marking Grid A)

For part 1, students could undertake research into existing solutions, materials and processes related to the client brief. They could then go on to produce freehand sketches, isometric and orthographic drawings of a design proposal. They could produce a PDS that details aspects of form, materials and production methods. Students could then use this as a focus for a questionnaire. The results of the survey could lead to suggestions about improvements that will be incorporated into the PDS.

Unit MP105_1A

Introduction to Materials Science in Manufacturing

General comments

There was some evidence of this unit being delivered in an innovative manner with students undertaking a range of practical activities. Some centres utilised support material published by Edexcel to good effect.

Learning Outcome 1 (Marking Grid A)

This learning outcome requires students to develop an awareness of the types of tests that can be performed on materials and the safety procedures associated with these tests. Most centres demonstrated a good balance between the range of different tests students undertook and the amount of data collected from these tests.

Learning Outcome 2 (Marking Grid A)

For this criterion students need to develop an awareness of the properties of materials. Centres could consider an approach that looks at a minimum of at least one property from each of the following; Chemical, Biological, Physical, Mechanical and Characteristics.

Learning Outcome 3 (Marking Grid A)

This outcome requires students to collect, present and report on test results.

Where centres have access to IT facilities, consideration should be given to using them to support students work. For example recording results in a spread sheet would allow graphical representation of the results.

Possible content for an A* assignment

Below is an indication of what a centre might encourage students to present as evidence for this unit. It is not a definitive list, simply an indication of what might be included.

At Level 1 A* grade students are likely to be able to construct and organise, with a degree of independence, their own format of evidence.

Learning Outcome 1 (Marking Grid A)

Students describe tests that cover at least three different techniques. This could cover at least 2 different sections from; Chemical, Biological, Physical, Mechanical or Characteristics. It is probable the materials being tested will come from their own area of practical experience (eg catering or engineering) and another less familiar area.

The students make brief statements about a range of safety rules that should be observed when conducting material testing. There may also be an indication of the consequences of not observing the rules.

Learning Outcome 2 (Marking Grid A)

Students name at least 6 different properties of materials. There will be some expansion of what the property means.

Learning Outcome 3 (Marking Grid A)

Students would use a spreadsheet to record tabular data collected from a range of tests. Students then make simple statements about observations they have made during the testing.

Learning Outcome 4 (Marking Grid B)

The assessor would provide a witness statement that the student has taken part of in the practical testing of a limited range of materials. This may be supported by photographic evidence.

Unit MP106_1A

Making a Product

General comments

This unit requires students to work in teams to plan the manufacture of a product. They need to take into account laws and regulations as well how the number of items being made affects production.

There were some instances this examination series where students were allowed to develop their own designs for products. Centres should be aware that this approach has some inherent risks. Based on the evidence seen this year, students may focus some of their effort towards activities that will not gain credit in this unit. Given that the time available to complete the course is a finite resource, this could have a detrimental effect on the level of success they achieve.

Learning Outcome 1 (Marking Grid A)

This learning outcome has three separate elements;

- The calculation of material quantities
- Selection of tools, materials and equipment
- Quality control.

For the first element there was some evidence of centres giving greater focus to the costs of materials, rather than the amount of materials required. While these are similar skills to calculating material quantities, this is not the focus of the assessment criteria.

Centres might consider one of the following approaches to providing the evidence required;

- Students could be given a recipe for a single product. From this they could calculate the amount of ingredients required to make a batch of the product. This could incorporate how many standard size packages would be needed for this amount. For example fourteen eggs might mean 3 packs of six would be needed.
- Students could be provided with a pattern for a garment. From this they could determine the length of fabric required for a single product, as well as a batch of products.
- Students could be provided with a drawing of an artefact. From this they could extract the amount of materials required for one artefact, and hence a batch.

At mark band 1 it is probable that sufficient evidence could be generated by a student solely through the demonstration of the ability to perform addition with some accuracy. Students performing in the mark band 3 criteria will probably provide evidence of multiplication/division skills. These suggestions are intended as guidance and are not an explicit requirement of the specification.

It is important that the moderator can follow the calculations the students perform and the allocation of assessor marks. Centres might wish to consider providing the moderator with a worked example of the calculations to assist in the judgement of the accuracy of the students work.

In the second section of this outcome students are required to select materials, tools and equipment. These will frequently be presented in the form a production plan which is made use of in later stages. While students are expected to work in teams to discuss the planning process, the actual plans should be produced as individuals. The production process is required to involve selecting computers or control systems. The evidence for using computers could range from CAM eg using a laser cutter, to producing some graphics printed onto paper and attached to the artefact.

Learning Outcome 3 (Marking Grid A)

The learning outcome has focuses on scales of production and factors affected by these scales of production.

The scales of production listed in the specification are one off, small batch, batch, continuous and flow.

A possible approach for students to produce evidence for this criterion would be to produce a table that lists and describes the interactions between scales of production and factors. For example;

Factor	production techniques	material requisitioning	costs	production facilities
Scale				
One off		Materials purchase as required		
Batch	CAM that can be set up for different repetitive tasks used e.g. laser cutter			
Continuous			"Bulk" buying allows discounts to be achieved.	

Learning Outcomes 1 and 2 (Marking Grid B)

Detailed observation records supported with annotated photographs are the type of evidence appropriate to support the marks awarded for this learning outcome.

Possible content for an A* assignment

Learning Outcome 1 (Marking Grid A)

Teams of students are presented with a drawing or recipe that has sufficient detail to allow them to manufacture the product. They discuss how many of the products

they are going to make, the amounts of materials needed and how to check the quality of the products.

As individuals they calculate the amount of materials required to make a batch of the products. Students should relate the amounts they need to the standard sizes the products are available in. For example, 1750g of flour would need two 1000g bags to be purchased.

Students could then be provided with a template onto which they enter plans about how to manufacture the product. A possible set of headings for the template are shown below.

Step	Time	Tools to be used	Description of task	Quality Control	Safety

The 'quality control' column would provide the evidence required for the final element of the learning outcome.

Learning Outcome 2 (Marking Grid A)

An empty copy of the table suggested above could be provided to the student where they enter their own descriptions of how the factors and scales of production interact.

Factor	production techniques	material requisitioning	costs	production facilities
Scale				
One off				
Batch				
Continuous				

For Mark Grid B, students could be encouraged to produce a diary that records their personal contributions to their team's performance.

Based on the evidence of the work submitted for moderation, the Edexcel Principal Learning in Manufacturing and Product Design qualification continues to provide Level 1 students with a varied, accessible and rewarding learning experience.

Grade Boundaries

Grade boundaries for this, and all other papers, can be found on the website on this link:

<http://www.edexcel.com/iwantto/Pages/grade-boundaries.aspx>

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with its registered office at Edinburgh Gate, Harlow, Essex CM20 2JE