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Specification

Edexcel GCSE in Manufacturing (Double Award) (2MN02)

For first teaching from 2009

Ofqual

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Introduction

The Edexcel GCSE in Manufacturing (Double Award) is designed for use in schools and colleges. It is part of a suite of GCSE qualifications offered by Edexcel.

About this specification

Key features of this specification include:

- the qualification is broken down into three distinct units
- detailed unit content for all units
- clear assessment criteria for the internally assessed units
- one paper that targets grades A* to G (no tiering).

Key subject aims

The Edexcel GCSE in Manufacturing (Double Award) aims to enable students to:

- engage in a range of manufacturing processes and develop as effective and independent learners
- develop a range of transferable manufacturing skills that will form a foundation for future learning and progression
- understand manufacturing and related sectors and the contribution they make to society and the economy
- develop an awareness of emerging technologies and sustainable development in the context of manufacturing.

Contents

Contents

Specification at a glance

The Edexcel GCSE in Manufacturing (Double Award) comprise of three units.

Unit 1 Designing Products for Manufacture *Unit code: 5MN01

- Internally assessed
- Availability: June
- First Assessment June 2011

30% of the total GCSE Double Award

Overview of content

- Analysing design briefs and producing design specifications and design solutions
- Producing prototypes
- Presenting design solutions

Overview of assessment

- Students to produce a design solution for a manufactured product
- Controlled assessment task, set by Edexcel and internally marked by centres
- Centres can contextualise the task to suit local needs
- 23-33 hours required to complete the assessment
- A total of 50 marks available
- Task to be made available in September 2009 and reviewed every two years

Unit 2 Manufactured Products *Unit code: 5MN02

- Internally assessed
- Availability: June
- First Assessment June 2011

30% of the total GCSE Double Award

Overview of content

- Interpreting product specifications and producing production plans
- Selecting and using suitable tools, components and processes to manufacture a quantity of a product

Overview of assessment

- Students to produce a quantity of a manufactured product that meets design requirements
- Controlled assessment task, set by Edexcel and internally marked by centres
- Centres can contextualise the task to suit local needs
- 23-33 hours required to complete the assessment
- A total of 50 marks available
- Task to be made available in September 2009 and reviewed every two years

Unit 3 Application of Technology in Engineering and Manufacturing *Unit code: 5EM03

- Externally assessed
- Availability: June
- First assessment: June 2011

40% of the total GCSE Double Award

Overview of content

- Investigating the use of information communication technology (ICT), modern and smart materials and control technology in manufacturing and engineering
- Understanding the impact and advantages and disadvantages of using modern technology in manufacturing and engineering
- Understanding the stages involved in manufacturing a product
- Investigating an engineered or manufactured product that uses modern technology

Overview of assessment

- Single examination lasting 1 hour and 30 minutes
- A mixture of short- and long-answer questions, with a total of 110 marks available
- Paper focuses on one of three chosen manufacturing sectors:
  - printing and publishing, paper and board
  - food and drink, biological and chemical
  - textiles and clothing
- As this unit is shared with the Edexcel GCSE in Engineering (Double Award), centres can choose to take the paper that focuses on one of the three sectors within that qualification
- Paper consists of two sections – Section A is made up of general questions about the chosen sector and section B focuses on a specific product identified in pre-release material made available in September

*See *Appendix 3* for a description of this code and all other codes relevant to this qualification.

A Qualification content

Knowledge, skills and understanding

The Edexcel GCSE in Manufacturing (Double Award) requires students to demonstrate a knowledge and understanding of:

- the production details and constraints faced by manufacturers, such as the availability of labour, materials and components, technology, health, safety, hygiene and quality standards
- the constraints of using a range of materials, components and/or ingredients due to their availability, form and supply, properties, characteristics, performance and cost, health, safety and hygiene requirements and handling and storage
- new technologies used in, and by, manufacturing industries to organise, monitor and control production, including information, communications and digital technologies, modern and smart materials and components, systems and control technology.

Students will investigate a range of manufacturing industries and products to develop an ability to:

- understand the impact of modern technologies on manufacturing industries, the way products are manufactured at different stages and the effect on the final product, as well as the advantages and disadvantages the use of modern technology has brought to society
- investigate a variety of manufactured products that use modern technology and the impact modern technology has on the design and production of a range of manufactured products
- research and analyse existing products, materials and manufacturing processes and market needs.

Students will develop a variety of skills used when designing a manufactured product, including the ability to:

- analyse client design briefs for manufactured products
- produce, utilise and modify design specifications for manufactured products consider material details and constraints
- apply quality standards. Develop design ideas, present a design solution for manufactured products and modify design solutions.

Students will also develop a knowledge and understanding of how to manufacture a product by:

- producing a prototype from a design solution
- selecting and using a range of appropriate materials, parts and components, processes, tools and equipment
- applying health and safety procedures and quality control techniques
- producing a batch of a product from a design solution as a member of a team
- analysing and evaluating the product in terms of the equipment, tools and processes used, and detail how these would be modified in real-world manufacturing.

List of unit contents

Unit 1 Designing Products for Manufacture

Overview

Content overview

In this unit students will gain an understanding of how the manufacturing industry brings a product to the marketplace, by working from a client design brief. Students will develop a design specification for a product, develop design and manufacturing proposals, and draw up a final design and manufacturing solution. They will also produce a prototype of their product.

Students will present their design solutions to a client and respond to feedback by modifying their design and manufacturing proposal accordingly.

Assessment overview

This unit will be assessed through a controlled assessment task which will require approximately 23-33 hours to complete. Students will need to produce a design solution for a manufactured product. They will have to carry out a series of activities including:

- analysing the design brief
- producing a design specification that identifies the main details of the product, the material constraints, the associated production requirements and quality standards
- producing, selecting and testing design solutions
- producing a prototype of the product
- presenting their design solution and modifying it based on client feedback.

A total of 50 marks are available for the task. Student design work must be produced under controlled conditions.

The controlled assessment task will be set by Edexcel and reviewed every two years.

The preparation and production of student designs and drawings must take place under controlled conditions. Students will be allowed to produce their design portfolios only during lesson time when supervised by a teacher or invigilator. Students' work must be collected in at the end of each lesson and handed back at the beginning of the next lesson. Students can undertake research under limited supervision.

Detailed unit content

Topic 1.1 Design for manufacture

Design briefs

Before starting their design, students will need to understand what the client wants. They will need to analyse a client design brief to identify the key features of the product and the manufacturing proposal. The key features are:

- function – where and what the product will be used for
- quality standards – sector and/or client quality standards
- styling aesthetics – the appearance and appeal of the product
- performance – how well the product has to perform
- intended markets – who might use the product, competition with similar products, client's own customer base
- size – the approximate size in three dimensions
- maintenance – how this is planned for in the design and during the product's use
- production methods and materials
- cost – including design, production and material costs
- regulations – including health and safety
- scale of production – quantity required, use of mass or batch production.

Design specification

In order to produce a design solution that meets the needs of the client, students must first analyse the design brief to identify the key design features. Students will need to research detailed information on each of these design features. Many design briefs are about adapting existing products rather than inventing new ones, and students will need to consider how the product could be manufactured most efficiently in order to meet the client's needs. They must then explain what is required, showing clear details and any decisions they have made about the intended product. This design specification will help students to produce their design solution.

Students must use their design specification to produce a design solution that meets client and sector requirements. To produce a design solution, they must learn to use all of the following techniques to develop their design ideas:

- research and analysis of information and data
- selection of most appropriate materials, components and ingredients based on a consideration of properties, characteristics, performance, availability, form supply, cost, health, safety and hygiene requirements, handling and storage
- selection of the most cost effective and efficient way to manufacture the product based on a consideration of labour requirements, materials and components, available technology, health, safety and hygiene, quality standards
- generation of ideas and solutions
- evaluation of ideas, solutions, testing and subsequent modifications
- modelling techniques.

Design solutions

Students must select the most appropriate design solution from their initial design ideas. To do this, they need to devise and apply tests against the design criteria at critical points in the development. The final design and manufacturing solution must include:

- justification of their final choice that refers to the key features in both the client design brief and the design specification
- details of the final design idea
- an explanation of how they met the client's requirements and complied with sector standards.

Topic 1.2 Manufacturing prototypes

Materials

As their manufacturing solution has not been tried, it is important that students learn how to design, make and test a prototype of their product.

When considering the design of a prototype students must consider which of the design features they need to prove. These design features may include:

- product features
- manufacturing techniques
- suitability of materials and components.

Manufacturing plans

Students must learn how to plan the manufacture of prototypes. Their plans should include:

- materials, parts and components to be used
- processes to be used
- tools, equipment and machinery to be used
- timescales
- health, safety and hygiene factors.

Manufacture prototypes

Students will need to combine, assemble and finish materials, and components/ingredients, safely to manufacture a prototype(s) which meets identified requirements. This should include:

- preparing and using materials, and components/ingredients safely
- preparing and using tools, equipment and machinery safely
- manufacturing their prototype(s) to demonstrate identified design features.

Topic 1.3 Presenting design and manufacturing solutions

Presentation contents

Students must present their chosen design solution to the client effectively. This presentation is their chance to 'sell' their proposal to the client, and it offers the client an opportunity to comment on the design solution.

Students must show how the work they have done to develop the design and manufacturing solution meets the client's design brief. Their presentation must explain:

- the key features of the solution, including information about manufacturing proposals and product features
- how they have met the client design brief
- what research they have carried out.

Presentation techniques

To present their design solution students will need to choose, and use, a range of appropriate presentation techniques which may include:

- fully annotated freehand sketches and drawings
- photographs and ICT-generated images
- samples and swatches
- technical drawings and diagrams
- written material
- spoken explanations
- mock-ups, models and prototypes.

Students should use appropriate ICT applications to develop and make their presentation.

Assessment criteria – Unit 1

Sections	Sub-sections	Marks	Level of response	Mark range
Investigation (18 marks)	a) Analysing the brief*	6	• Level of response not worthy of credit.	0
			• An analysis of the brief to identify basic client needs, with the 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.	1–2
			• 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.	3–4
			• 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 punctuation and few spelling errors.	5–6
	b) Specification — product criteria and material constraints*	6	• Level of response not worthy of credit.	0
			• Production of a design specification that identifies the basic details of the product criteria and the material constraints. Design specification makes little use of correct grammar and includes frequent spelling mistakes, with incorrect or inappropriate use of terminology.	1–2
			• Production of a design specification that describes some of the main details of the product criteria and the material constraints. Details are presented using sound standards of legibility, spelling and punctuation. Terminology is mostly used appropriately.	3–4
			• Production of a design specification that explains the main details of the product criteria and the material constraints. Few grammar, punctuation and spelling errors and there is good use of accurate terminology.	5–6

Sections	Sub-sections	Marks	Level of response	Mark range
	c) Specification — production requirements and quality standards*	6	• Level of response not worthy of credit.	0
			• 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.	1–2
			• 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 used appropriately.	3–4
			• 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.	5–6
Design (12 marks)	d) Ideas and design solutions*	6	• Level of response not worthy of credit.	0
			• 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.	1–2
			• Generation of alternative design ideas and the development, in some detail, of manufacturing design solutions. Ideas and solutions are presented using a sound standard of spelling and punctuation. Terminology is mostly used appropriately.	3–4
			• 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.	5–6

Sections	Sub-sections	Marks	Level of response	Mark range
	e) Testing and selecting the final solution*	6	• Level of response not worthy of credit.	0
			• 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.	1–2
			• 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.	3–4
			• 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.	5–6
Make (8 marks)	f) Prototype	8	• Level of response not worthy of credit.	0
			• Select, with support and guidance, of some appropriate processes, tools and equipment, using them safely with some skill to make a prototype.	1–2
			• Select, with limited support and guidance, of appropriate processes, tools and equipment, using them safely with skill to make a prototype.	3–5
			• Independent selection of appropriate processes, tools and equipment, using them safely with skill and accuracy to make a prototype.	6–8
Communication (6 marks)	g) Presentation techniques	6	• Level of response not worthy of credit.	0
			• Selection and use of a limited range of techniques to present the final solution.	1–2
			• Selection and use of a range of techniques to present, in some detail, the final solution.	3–4
			• Selection and use of an appropriate range of techniques to present, in detail, the final solution.	5–6

Sections	Sub-sections	Marks	Level of response	Mark range
Evaluation (6 marks)	h) Final review*	6	• Level of response not worthy of credit.	0
			• 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.	1–2
			• Description, in some detail, of how the final design solution meets the client design brief and design specification, describing relevant modifications. Written material is generally free of errors and terminology is mostly used accurately and appropriately.	3–4
			• 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 or punctuation and grammar and there is good use of accurate terminology.	5–6
	Total marks:	**50**		**50**

*Opportunity for students to be assessed on Quality of Written Communication.

Unit 2 Manufactured Products

Overview

Content overview

In this unit students will work as part of a team to manufacture a quantity of products. They will learn how to use a production plan and how to develop a schedule for manufacture.

Students will learn how to use and apply quality control procedures and techniques, and will use a variety of tools and equipment to manufacture products.

Assessment overview

This unit will be assessed through a controlled assessment task which will require approximately 23-33 hours to complete. Students will need to produce a quantity of the same manufactured product. They will need to carry out a series of activities including:

- producing a schedule for manufacture
- preparing and using materials, tools, equipment and machinery
- manufacturing products to meet requirements
- using quality control techniques
- modifying a production plan and schedule for manufacture.

A total of 50 marks is available for the task. Student work must be produced under controlled conditions.

The controlled assessment task will be set by Edexcel and reviewed every two years.

The preparation and production of student work must take place under controlled conditions. Students will be allowed to produce their products and related portfolios only during lesson time when supervised by a teacher or invigilator. Student work must be collected at the end of each lesson and handed back at the beginning of the next lesson. Students can undertake research under limited supervision.

Detailed unit content

Topic 2.1 Interpreting product specifications and production plans

Product specification

In order to make a manufactured product, students will need to know the specific requirements for all the different parts of the product. This information is contained within the product specification and working drawings and/or diagrams. Students need to understand and use the information in the product specification to make decisions about the development of a product. Students must learn how to use a product specification and be able to recognise the following essential information:

- size, shape, form
- materials, parts and components
- process methods, where these are specified
- quantity required, for example single unit, batch and volume production
- timescales.

Production planning

The production plan provides all the details required to make a product. Students must use these details in order to develop a schedule for the manufacture of a number of products. The details that need to be taken into account include:

- materials, parts and components to be used
- processes to be used
- tools, equipment and machinery to be used
- the sequence of production, including critical production and quality control points
- production scheduling, including realistic deadlines
- how quality will be checked and inspected
- health and safety factors.

Students must be able to modify their plans as circumstances change.

Schedule for manufacture

In order to make a number of products as a member of a team, students will need to be able to use, monitor and modify a production plan to develop a realistic schedule for manufacture. A schedule for manufacture should include the following information:

- all preparation, processing and assembly stages
- the sequencing and timing of stages
- critical production and quality control points
- production and quality control procedures
- allocation of tasks and responsibilities.

Students must be able to modify the schedule for manufacture as circumstances change.

Topic 2.2 Producing a manufactured product

Teamwork

Students will work as part of a team to manufacture a quantity of products. In order to ensure that the manufacturing process is successful, they will need to understand how an effective team can be built and maintained through:

- allocating and agreeing roles and responsibilities, based on the strengths and weaknesses of team members
- setting and agreeing individual and team targets
- ensuring good communication between team members
- ensuring that team members are motivated
- creating an appropriate working environment.

Material preparation

When manufacturing their products, students will need to understand the functions of, and be able to prepare, materials, components or ingredients.

For **printing and publishing, paper and board**, for example:

- cardboard, coated card, bleed proof card, box board, carton board, solid white board, holographic card, cartridge paper, photo-glossy paper, laminated paper, thermochromic inks, phosphorescent pigments, laminates, composites, polymorph, thermoplastics.

For **food and drink, biological and chemical**, for example:

- flours, fats/oils, sugars/syrups, fruits, nuts, eggs, milks, water, salt, yeast, chemical aerators, chocolate, colours, flavours, emulsifiers, stabilisers, starches, gums, gels, preservatives, antioxidants, sweeteners, humectants, spices, enzymes.

For **textiles and clothing**, for example:

- fabrics, linings, liquid crystal coated fabric, thermochromic dyes, smart fabrics, laminated fabric, coated fabrics, thread, labels, polymer fabrics.

For **other manufacturing industries**, for example:

- ferrous and non-ferrous metals and alloys, thermosetting polymers, thermoplastic polymers, ceramics, composites, bi-metal strips, carbon composites, sintered metals, wood (hard or soft).

Tools, equipment and machinery

Students must be able to select, prepare and use tools, equipment and machinery needed for the manufacture of the product.

For **printing and publishing, paper and board**, for example:

- shears, guillotine, rotary cutter, scalpel, templates, punches, dies, pens and pencils, airbrush, technical instruments (ie French curves, rule, dividers, stencils), optical sensors, densitometer charts, bindings, stitching, staples, clips, fasteners, pins, tags.

For **food and drink, biological and chemical**, for example:

- food mixers, blenders, food processors, weighing scales, measuring jugs, pans, bakers ovens, microwave ovens, cookers, refrigerators, freezers, thermometers, graters, hand whisks, rolling pins, biscuit cutters, cooling racks, can openers, sieves

For **textiles and clothing**, for example:

- overlocker, automatic sewing machines, steam press iron, flat bed, pocket setter.

For **other manufacturing industries**, for example:

- hand tools, power tools, mechanical equipment, electrical/electronic equipment, pneumatic/hydraulic equipment.

Processing materials and components

Students must learn how to use appropriate tools, equipment, including Computer Aided Manufacture (CAM), and machinery safely. They will need to be able to use manufacturers' instructions to produce a number of the given product. To do this, students must be able to carry out the following processes.

For **printing and publishing, paper and board**, for example:

- offset lithography, screen printing, relief printing, varnishing, lacquering, embossing, laminating, foil blocking, vacuum forming, thermoforming, die cutting, folding, scoring, trimming, gluing, casing-in, pre-press (ie lay planning), vinyl cutting, laser cutting, sheet or web feed.

For **food and drink, biological and chemical**, for example:

- weighing, measuring, sieving, mixing, blending, depositing, dividing, baking, cooking, cooling, chilling, freezing, bottling, pasteurising, canning, rolling, laminating, forming, shaping, decorating, packaging, labelling, coding, storage, distribution, cleaning.

For **textiles and clothing**, for example:

- dyeing, printing, embroidery, appliqué, spreading, cutting, fusing, bonding, just-in-time, pressing, packaging.

For **other manufacturing industries,** for example:

- turning, drilling, etching, milling, grinding, shaping, hammering, forming, bending, joining, crimping, soldering, adhesion, wiring, threaded fasteners, welding, brazing, annealing, tempering, hardening, etching, plating, polishing, coating.

Assembly

Students must be able to combine, assemble and finish materials, component's and/or ingredients to a production plan and schedule for manufacture, in order to meet client requirements and conform to quality standards.

Quality and production control techniques

Students must understand the quality indicators provided in the production plan and be able to apply these during manufacture and assembly. They must be able to:

- inspect, test and compare (as required) samples of the product material, component and/or ingredient at the critical control points specified in their schedule for manufacture
- record data in appropriate formats, using manual techniques or ICT applications
- identify variances from the quality standards and suggest possible causes and changes needed to prevent them from happening again
- monitor the progress of production, and identify, record and remedy any variance from the schedule for manufacture.

Health, safety and hygiene

Students must be aware of the health, safety and hygiene issues relating to the use of the materials, components, tools and equipment required for their manufacturing activities. Students must be able to:

- carry out a risk assessment
- care for themselves and others in a manufacturing environment
- follow health and safety procedures and instructions
- keep a safe place of work
- check that safety equipment, health, safety and hygiene procedures and systems are operational
- use safety equipment and health and safety and hygiene procedures and systems correctly during processing, combining, assembly and finishing.

Assessment criteria – Unit 2

Sections	Sub-sections	Marks	Level of response	Mark range
Teamwork (6 marks)	a) Work as part of an effective team	6	• Level of response not worthy of credit.	0
			• Contributed to the work of an effective team, and success in meeting some targets.	1–2
			• Helped build an effective team, and success in meeting key targets.	3–4
			• Played a leading role in ensuring that the team worked effectively and success in meeting all achievable targets.	5–6
Plan (6 marks)	b) Produce a schedule for manufacture*	6	• Level of response not worthy of credit.	0
			• 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	1–2
			• 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.	3–4
			• Confident use of the main information within a production plan, 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.	5–6

Sections	Sub-sections	Marks	Level of response	Mark range
Make (32 marks)	c) Prepare and use materials	6	• Level of response not worthy of credit.	0
			• Preparation, with guidance, of materials and components, according to some relevant production criteria, using materials safely with some skill to make a product.	1–2
			• Preparation, with limited guidance, of materials and components, according to the main production criteria, using materials safely with skill to make a product.	3–4
			• Independent preparation of materials and components, according to all relevant production criteria, achieving optimum and safe use of materials when making a product.	5–6
	d) Prepare and use tools, equipment and machinery	6	• Level of response not worthy of credit.	0
			• Preparation, with guidance, of tools, equipment and machinery, using them safely with some accuracy and skill to make a product.	1–2
			• Preparation, with limited guidance, of tools, equipment and machinery, using them safely with accuracy and skill to make a product.	3–4
			• Independent and precise preparation of tools, equipment and machinery, using them safely with accuracy and skill to make a product.	5–6
	e) Manufacture products to meet requirements	8	• Level of response not worthy of credit.	0
			• Safe manufacture of products, to meet some client requirements and conform to some required quality standards.	1–2
			• Safe manufacture of products, to meet the main client requirements and conform to the main required quality standards.	3–5
			• Safe manufacture of products, to effectively meet the main client requirements and consistently conform to the main required quality standards.	6–8
	f) Monitor production	6	• Level of response not worthy of credit.	0
			• Simple monitoring of production activities.	1–2
			• Monitoring and recording progress of manufacturing activities.	3–4
			• Detailed and consistent monitoring of production activities in order to maintain production.	5–6

Sections	Sub-sections	Marks	Level of response	Mark range
	g) Use quality control techniques	6	• Level of response not worthy of credit.	0
			• Limited use of quality control techniques to monitor production and identify problems.	1–2
			• Use of a range of quality control techniques to monitor production and describe the causes of problems.	3–4
			• Use of objective quality control techniques to monitor production and explain how to prevent problems happening again.	5–6
Review and modify (6 marks)	h) Modify production plan and schedule for manufacture	6	• Level of response not worthy of credit.	0
			• Modifications in response to quality data, some of which are relevant and lead to the improvement of some aspects of the production plan and schedule for manufacture.	1–2
			• 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.	3–4
			• 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.	5–6
	Total marks:	**50**		**50**

*Opportunity for students to be assessed on Quality of Written Communication.

Unit 3 Application of Technology in Engineering and Manufacturing

Overview

Content overview

Technology affects every stage in the design and manufacture of products. In this unit students will investigate the impact of modern technology on the design and manufacture of a range of products in different manufacturing and engineering sectors. They will learn how new technology has helped to develop design and manufacturing processes and improve the quality of products and services offered to customers. They will also learn about the benefits and implications modern technology has for the workforce, the wider community, the global environment and sustainability.

Students will investigate the impact of:

- information and communications technology (ICT)
- new components and a range of modern materials, including smart materials
- control technology.

This unit links with *Unit 1: Designing Products for Manufacture* and *Unit 2: Manufactured Products* where students will have the opportunity to use new technology and materials.

Assessment overview

This unit will be assessed through a single examination paper set and marked by Edexcel. Students must be entered for assessment in one of the following manufacturing sectors:

- printing and publishing, paper and board
- food and drink, biological and chemical
- textiles and clothing
- engineering fabrication
- electrical and electronics, process control, computers, telecommunications
- mechanical, automotive.

Students will need to answer a range of questions, relating to their chosen sector. The examination paper consists of two sections. In section A questions will relate to general information about the chosen sector.

Section B refers to pre-release material that illustrates a particular product from the chosen sector and questions will relate to that product. The material will be pre-released in September for the following June's examination and will act as a focus for research in preparation for the examination. A total of 110 marks is available will be available.

Detailed unit content

Topic 3.1 Modern technologies

Engineering and manufacturing sectors

Students will investigate the impact of modern technology on the design and manufacture of a range of products across different sectors. When investigating products, they must identify the sector in which the product was made. For example:

- printing and publishing, paper and board
- food and drink, biological and chemical
- textiles and clothing
- engineering fabrication
- electrical and electronics, process control, computers, telecommunications
- mechanical, automotive.

ICT

Students will learn about, and look at examples of, how modern technology is involved in the design and manufacture of a range of products. This will include the use of information and communications technology (ICT), including:

- sourcing and handling information and data, such as databases, spreadsheets and internet sites
- CAD (computer-aided design) techniques
- CAM (computer-aided manufacture)
- communications technology
- control technology.

Modern and smart materials

Students will learn about the use of modern and smart materials and components in engineering and manufacturing, such as:

- polymers, including plastics, adhesives and coatings
- metals and composites, including shape memory alloys
- microelectronic components and parts, including integrated circuits and display devices
- thermochromic inks, phosphorescent pigments, laminates, composites, polymorph, thermoplastics
- biological, chemical and food products, modified ingredients and methods of preparation and production
- computer technology, including microprocessors and memory devices
- textile technology, including liquid crystal coated fabrics and thermochromic dyes.

Control technology

Students will also learn about the use of systems and control technology to organise, monitor and control production, including:

- process/quality control and automation, including programmable logic controllers (PLCs) and embedded computers such as those used in both industrial and domestic appliances
- robotics, including continuous operation, improved reproducibility, increased speed, work in hazardous environments
- ICT as applied to integrated manufacturing systems, computer-integrated engineering (CIE), computer-integrated manufacturing (CIM) and including CAD/CAM links.

Impact of technology

Students must understand the impact of these modern technologies on the:

- range, types and availability of products
- design and development of products
- materials, components and ingredients used
- safety and efficiency of modern methods of production, in terms of materials, energy consumption and time
- improved characteristics of products, such as size, weight/density, ease of use, disposability and reclaimability
- markets for the products.

Advantages and disadvantages

Students must also understand the advantages and disadvantages that the use of modern technology has for society, including:

- changes in the type and size of the workforce
- changes in the working environment
- impact on the global environment and sustainability.

Topic 3.2 Investigating engineered or manufactured products

Stages in manufacturing

Making a product involves a number of important stages and activities. When looking at a product, students must be able to identify the main stages and activities involved in making the product. They also need to understand the impact of modern technology on the stages of manufacturing. These stages can be grouped generally as:

- design
- marketing
- production planning
- material supply and control
- processing and production
- assembly and finishing
- packaging and dispatch.

Investigating products

Students will learn how to investigate products that use modern technology by:

- researching information from manufacturers and suppliers
- handling and examining individual products
- carrying out simple assessment of properties, such as structure, heaviness, taste, colour and feel of surfaces, scratch and wear resistance, areas likely to be damaged
- evaluating the need for the technology, materials and components used.

Role of technology in engineering and manufacturing

When investigating technology in engineering and manufacturing, students should consider the:

- role that modern technology plays in the design and manufacture of the product
- technology or process it replaced
- benefits of using the technology such as lean manufacturing and just-in-time manufacturing
- implications of using the technology for the product and the manufacturer.

B Assessment

Assessment summary

Units 1 and 2 are internally assessed under controlled conditions.

Unit 3 is assessed through a written examination paper.

Summary of table of assessment

Unit 1	Designing Products for Manufacture	Unit code: 5MN01

- Students to produce a design solution for a manufactured product
- Controlled assessment task, set by Edexcel and internally marked by centres
- Centres can contextualise the task to suit local needs
- Approximately 23-33 hours required to complete the assessment
- A total of 50 marks available
- Task to be made available in September 2009 and reviewed every two years

Unit 2	Manufactured Products	Unit code: 5MN02

- Students to produce quantity of a manufactured product that meets design requirements
- Controlled assessment task, set by Edexcel and internally marked by centres
- Centres can contextualise the task to suit local needs
- Approximately 23-33 hours required to complete the assessment
- A total of 50 marks available
- Task to be made available in September 2009 and reviewed every two years

Unit 3 Application of Technology in Engineering and Manufacturing — Unit code: 5EM03

- Single examination, lasting 1 hour and 30 minutes
- A mixture of short- and long-answer questions, a total of 110 marks available
- Paper focuses on one of six chosen engineering and manufacturing sectors:
  - printing and publishing, paper and board
  - food and drink, biological and chemical
  - textiles and clothing
  - engineering fabrication
  - electrical and electronic/computer/process control/telecommunications
  - mechanical automotive
- Consists of two sections – Section A is made up of general questions about the chosen sector and section B focuses on a specific product identified in pre-release material made available in September

Assessment Objectives and weightings

	% in GCSE Double Award
AO1: Recall, select and communicate their knowledge and understanding of a range of contexts.	30%
AO2: Apply skills, knowledge and understanding, including quality standards, in a variety of contexts and to plan and carry out investigations and tasks, involving a range of tools, equipment, materials and components.	53%
AO3: Analyse and evaluate evidence, make reasoned judgements and present conclusions.	17%
TOTAL	**100%**

Relationship of Assessment Objectives to units

Unit number	Assessment Objective			
	AO1	AO2	AO3	Total for AO1, AO2 and AO3
Unit 1	6%	20%	4%	30%
Unit 2	3%	24%	3%	30%
Unit 3	21%	9%	10%	40%
Total for GCSE Double Award	30%	53%	17%	100%

Entering your students for assessment

Student entry

Details of how to enter students for this qualification can be found in Edexcel's *Information Manual*, a copy is sent to all examinations officers. The information can also be found on Edexcel's website: www.edexcel.com

Students studying unitised GCSE Double Award qualifications are required to complete at least 40% of the overall assessment requirements as terminal assessment.

Forbiddencombinations and classification code

Centres should be aware that students who enter for more than one GCSE qualification with the same classification code will have only one grade (the highest) counted for the purpose of the school and college performance tables.

Students should be advised that, if they take two specifications with the same classification code, schools and colleges are very likely to take the view that they have achieved only one of the two GCSEs. The same view may be taken if students take two GCSE specifications that have different classification codes but have significant overlap of content. Students who have any doubts about their subject combinations should check with the institution to which they wish to progress before embarking on their programmes.

Students entering for this qualification may not enter for:

- GCSE in Engineering (Double Award)

Access arrangements and special requirements

Edexcel's policy on access arrangements and special considerations for GCE, GCSE, and Entry Level aims to enhance access to the qualifications for students with disabilities and other difficulties (as defined by the Disability Discrimination Act 1995 and the amendments to the Act) without compromising the assessment of skills, knowledge, understanding or competence.

Please see the Edexcel website (www.edexcel.com/sfc) for:

- the JCQ policy Access Arrangements and Special Considerations, Regulations and Guidance Relating to students who are Eligible for Adjustments in Examinations.
- the forms to submit for requests for access arrangements and special considerations
- dates for submission of the forms.

Requests for access arrangements and special considerations must be addressed to:

Special Requirements
Edexcel
One90 High Holborn
London WC1V 7BH

Disability Discrimination Act (DDA)

Please see the Edexcel website (www.edexcel.com/sfc) for information with regard to the Disability Discrimination Act.

Controlled assessment

In controlled assessments, control levels are set for three linked processes: task setting, task taking and task marking. The control levels (high, medium or limited, dependent on the subject) are set for each process so that the overall level of control secures validity and reliability, provides good manageability for all involved and allows teachers to authenticate student work confidently.

The summary of the controlled conditions for this specification are shown below.

Summary of conditions for controlled assessment

Task setting — high level of control

Tasks will be set by Edexcel and centres will choose from a list of tasks. Centres can contextualise the task(s) to best suit their circumstances, which includes the availability of and access to resources.

Task taking — medium level of control

All work, with the exception of research and preparation, must be done under informal supervision. Research and preparation may be completed under limited supervision.

Task marking — medium level of control

The marking of the tasks will be carried out by teachers and moderated by Edexcel.

Controlled conditions

The preparation and production of student designs and drawings must take place under controlled conditions. Students will be allowed to produce their design portfolios and manufactured products only during lesson time when supervised by a teacher or invigilator. Student's work must be collected in at the end of each lesson and handed back at the beginning of the next lesson.

Teachers are allowed to provide regular formative feedback throughout the creative design process. Demonstrations of practical activities are allowed in order to develop knowledge, understanding and skills and to identify health and safety issues relating to specific tools, equipment and processes.

Where group work occurs, evidence of individual contributions must be clearly identified and recorded.

Internal standardisation

Teachers must show clearly how the marks have been awarded in relation to the assessment criteria. If more than one teacher in a centre is marking students' work, there must be a process of internal standardisation to ensure that there is consistent application of the assessment criteria.

Authentication

All students must sign an authentication statement. Statements relating to work not sampled should be held securely in the centre. Those which relate to sampled students must be attached to the work and sent to the moderator. In accordance with a revision to the current Code of Practice, any student unable to provide an authentication statement will receive zero credit for the component. Where credit has been awarded by a centre-assessor to sampled work without an accompanying authentication statement, the moderator will inform Edexcel and the mark will be adjusted to zero.

Further information

For more information on annotation, authentication, mark submission and moderation procedures, please refer to the *Edexcel GCSE in Manufacturing (Double Award): Instructions and administrative documentation for internally assessed units* document, which is available on the Edexcel website.

For up-to-date advice on teacher involvement, please refer to the Joint Council for Qualifications (JCQ) Instructions for conducting coursework/portfolio document on the JCQ website: www.jcq.org.uk. For up-to-date advice on malpractice and plagiarism, please refer to the Joint Council for Qualifications (JCQ) *Suspected Malpractice in Examinations: Policies and Procedures and Instructions for conducting coursework/portfolio* documents on the JCQ website (www.jcq.org.uk).

Assessing your students

The first assessment opportunity for Units 1, 2 and 3 of this qualification will take place in the June 2011 series and in each following June series for the lifetime of the specification.

Your student assessment opportunities

Unit	June 2011	June 2012	June 2013	June 2014	June 2015
Unit 1: Designing Products for Manufacture	✓	✓	✓	✓	✓
Unit 2: Manufactured Products	✓	✓	✓	✓	✓
Unit 3: Application of Technology in Engineering and Manufacturing	✓	✓	✓	✓	✓

Awarding and reporting

The grading, awarding and certification of this qualification will comply with the requirements of the current GCSE/GCE Code of Practice for courses starting in September 2009, which is published by the Qualifications and Curriculum Authority (QCA). The GCSE Double Award qualification will be graded and certificated on a 15-grade scale from A*A* to GG. Individual unit results will be reported.

The first certification opportunity for the Edexcel GCSE in Manufacturing (Double Award) will be 2011.

Students whose level of achievement is below the minimum judged by Edexcel to be of sufficient standard to be recorded on a certificate will receive an unclassified U result.

Unit results

The minimum uniform marks required for each grade for each unit:

Units 1 and 2

Unit grade	*A	A	B	C	D	E	F	G
Maximum uniform mark = 90	**81**	**72**	**63**	**54**	**45**	**36**	**27**	**18**

Students who do not achieve the standard required for a grade G will receive a uniform mark in the range 0–17.

Unit 3

Unit grade	*A	A	B	C	D	E	F	G
Maximum uniform mark = 120	**108**	**96**	**84**	**72**	**60**	**48**	**36**	**24**

Students who do not achieve the standard required for a grade G will receive a uniform mark in the range 0–23.

Qualification results

The minimum uniform marks required for each grade:

GCSE in Manufacturing (Double Award) cash-in code: 2MN02

Qualification grade	A* A*	A* A	A A	A B	B B	B C	C C	C D	D D	D E	E E	E F	F F	F G	G G
Maximum uniform mark = 300	**270**	**255**	**240**	**225**	**210**	**195**	**180**	**165**	**150**	**135**	**120**	**105**	**90**	**75**	**60**

Students who do not achieve the standard required for a grade GG will receive a uniform mark in the range 0–59.

Resitting of units

Students can resit the assessment requirements for an internally and externally assessed unit once before claiming certification for the qualification. The best available result for each contributing unit will count towards the final grade.

For internally assessed units students will need to retake the entire assessment requirement for that unit.

Students wanting to resit after they have completed all the assessment requirements of the course will be required to retake at least 40 per cent of the assessment requirements.

Results of units will be held in Edexcel's unit bank for as many years as this specification remains available. Once the Double Award qualification has been certificated, all unit results are deemed to be used up at that level. These results cannot be used again towards a further award of the same qualification at the same level.

Language of assessment

Assessment of this specification will be available in English only. Assessment materials will be published in English only and all work submitted for examination and moderation must be produced in English.

Quality of written communication

Students will be assessed on their ability to:

- write legibly, with accurate use of spelling, grammar and punctuation in order to make the meaning clear
- select and use a form and style of writing appropriate to purpose and complex subject matter
- organise relevant information clearly and coherently, using specialist vocabulary when appropriate.

Stretch and challenge

Students can be stretched and challenged in all units through the use of different assessment strategies, for example:

- using a variety of stems in questions – for example analyse, evaluate, discuss, compare
- ensuring connectivity between sections of questions
- a requirement for extended writing
- use of a wider range of question types to address different skills – for example open-ended questions, case studies.

Malpractice and plagiarism

For up-to-date advice on malpractice and plagiarism, please refer to the Joint Council for Qualifications *Suspected Malpractice in Examinations: Policies and Procedures* document on the JCQ website www.jcq.org.uk/

Student recruitment

Edexcel's access policy concerning recruitment to our qualifications is that:

- they must be available to anyone who is capable of reaching the required standard
- they must be free from barriers that restrict access and progression
- equal opportunities exist for all students.

Progression

The Edexcel in GCSE Manufacturing (Double Award) offers opportunities for progression such as:

- related qualifications at Level 3, for example in GCE in Engineering, BTEC National Certificate and Diploma in Manufacturing
- employment within the manufacturing sector and related industries.

Grade descriptions

A	Candidates recall, select and communicate a detailed knowledge and thorough understanding of manufacturing. They apply relevant knowledge, understanding and skills in a range of situations to plan and carry out investigations and tasks effectively. They test their solutions, working safely and with a high degree of precision. They analyse and evaluate the evidence available, reviewing and adapting their methods when necessary. They present information clearly and accurately, making reasoned judgements and presenting substantiated conclusions.
C	Candidates recall, select and communicate a sound knowledge and understanding of manufacturing. They apply knowledge, understanding and skills in a range of situations to plan and carry out investigations and tasks. They test their solutions, working safely and with precision. They review the evidence available, analysing and evaluating some information clearly and with some accuracy. They make judgements and draw appropriate conclusions.
F	Candidates recall, select and communicate knowledge and understanding of basic aspects of manufacturing. They apply limited knowledge, understanding and skills to plan and carry out simple investigations and tasks, with an awareness of the need for safety and precision. They modify their approach in the light of progress. They review their evidence and draw basic conclusions.

C Resources, support and training

Edexcel resources

Edexcel aims to provide the most comprehensive support for our qualifications.

For up-to-date information on published resources, please visit www.edexcel.com/gcse2009

Edexcel publications

You can order further copies of the Specification and Sample Assessment Materials (SAMs) and Teacher's Guide documents from:

Edexcel Publications
Adamsway
Mansfield
Nottinghamshire NG18 4FN

Telephone: 01623 467467
Fax: 01623 450481
Email: publications@linneydirect.com
Website: www.edexcel.com

Endorsed resources

Edexcel also endorses some additional materials written to support this qualification. Any resources bearing the Edexcel logo have been through a quality assurance process to ensure complete and accurate support for the specification. For up-to-date information about endorsed resources, please visit www.edexcel.com/endorsed

Please note that while resources are checked at the time of publication, materials may be withdrawn from circulation and website locations may change.

Edexcel support services

Edexcel has a wide range of support services to help you implement this qualification successfully.

ResultsPlus – ResultsPlus is an application launched by Edexcel to help subject teachers, senior management teams, and students by providing detailed analysis of examination performance. Reports that compare performance between subjects, classes, your centre and similar centres can be generated in 'one-click'. Skills maps that show performance according to the specification topic being tested are available for some subjects. For further information about which subjects will be analysed through ResultsPlus, and for information on how to access and use the service, please visit www.edexcel.com/resultsplus

Ask the Expert – Ask the Expert is a new service, launched in 2007, that provides direct email access to senior subject specialists who will be able to answer any questions you might have about this or any other specification. All of our specialists are senior examiners, moderators or verifiers and they will answer your email personally. You can read a biography for all of them and learn more about this unique service on our website at www.edexcel.com/asktheexpert

Ask Edexcel – Ask Edexcel is Edexcel's online question and answer service. You can access it at www.edexcel.com/ask or by going to the main website and selecting the Ask Edexcel menu item on the left.

The service allows you to search through a database of thousands of questions and answers on everything Edexcel offers. If you don't find an answer to your question, you can choose to submit it straight to us. One of our customer services team will log your query, find an answer and send it to you. They'll also consider adding it to the database if appropriate. This way the volume of helpful information that can be accessed via the service is growing all the time.

Examzone – The Examzone site is aimed at students sitting external examinations and gives information on revision, advice from examiners and guidance on results, including re-marking, resitting and progression opportunities. Further services for students – many of which will also be of interest to parents – will be available in the near future. Links to this site can be found on the main homepage at www.examzone.co.uk

Training

A programme of professional development and training courses, covering various aspects of the specification and examination, will be arranged by Edexcel each year on a regional basis. Full details can be obtained from:

Training from Edexcel
Edexcel
One90 High Holborn
London WC1V 7BH

Telephone: 0844 576 0027
Email: trainingbookings@edexcel.com
Website: www.edexcel.com

D Appendices

Appendix 1 Key skills

Signposting

Key skills (Level 2)	Unit 1	Unit 2	Unit 3
Application of number			
N2.1		✓	
N2.2	✓	✓	✓
N2.3	✓	✓	
Communication			
C2.1a	✓		
C2.1b	✓		
C2.2		✓	
C2.3	✓		
Information and communication technology			
ICT2.2		✓	
Problem solving			
PS2.1	✓	✓	
PS2.2	✓	✓	
PS2.3	✓		
Working with others			
WO2.1		✓	
WO2.2		✓	

Development suggestions

Please refer to the Edexcel website for key skills development suggestions.

Appendix 2 Wider curriculum

Signposting

Issue	Unit 1	Unit 2	Unit 3
Moral	✓	✓	✓
Ethical	✓	✓	✓
Social	✓	✓	✓
Cultural	✓	✓	✓
Citizenship			✓
Environmental	✓		✓
European initiatives	✓	✓	
Health and safety	✓	✓	✓

Development suggestions

Issue	Unit	Opportunities for development or internal assessment
Moral	Unit 1	When interpreting the design brief the moral obligation to fulfil the brief (ie cheapest possible versus best option).
	Unit 2	Effective teamwork will require considering the different views and backgrounds of others.
	Unit 3	When considering the implications of technology and the impact it can have on society and the environment.
Ethical	Unit 1	When interpreting the design brief the ethical obligation to fulfil the brief (ie cheapest possible versus best option).
	Unit 2	Effective teamwork will require considering the different views and backgrounds of others.
	Unit 3	When considering the implications of technology and the impact it can have on society and the environment.
Social	Unit 1	How social issues will impact on client design briefs and how these are interpreted.
	Unit 2	Effective teamwork will require considering the different views and backgrounds of others.
	Unit 3	When considering the implications of technology and the impact it can have on society and the environment.
Cultural	Unit 1	How cultural issues will impact on client design briefs and how these are interpreted.
	Unit 2	Effective teamwork will require considering the different views and backgrounds of others.
	Unit 3	When considering the implications of technology and the impact it can have on society and the environment.
Citizenship	Unit 3	When considering the implications of technology and the impact it can have on society and the environment.
Environmental	Unit 1	Design briefs should take into account any relevant environmental issues.
	Unit 3	When considering the implications of technology and the impact it can have on society and the environment.
European initiatives	Unit 1	Design briefs will have to conform to European standards.
	Unit 2	Quality control and health, safety and hygiene will introduce European legislation.
Health and safety	Units 1, 2 and 3	Health and safety needs to be considered throughout the design and manufacture of a product.

Appendix 3 Codes

Type of code	Use of code	Code number
National classification codes	Every qualification is assigned to a national classification code indicating the subject area to which it belongs. Centres should be aware that students who enter for more than one GCSE qualification with the same classification code will have only one grade (the highest) counted for the purpose of the school and college performance tables.	0005
National Qualifications Framework (NQF) codes	Each qualification title is allocated a National Qualifications Framework (NQF) code. The NQF code is known as a Qualification Number (QN). This is the code that features in the DfE's Sections 96 and on the LARA as being eligible for 16-18 and 19+ funding, and is to be used for all qualification funding purposes. The QN is the number that will appear on the student's final certification documentation.	The QAN for the qualification in this publication is: GCSE Double Award – 500/4579/9
Unit codes	Each unit is assigned a unit code. This unit code is used as an entry code to indicate that a student wishes to take the assessment for that unit. Centres will need to use the entry codes only when entering students for their examination.	Unit 1 – 5MN01 Unit 2 – 5MN02 Unit 3 – 5EM03
Cash-in codes	The cash-in code is used as an entry code to aggregate the student's unit scores to obtain the overall grade for the qualification. Centres will need to use the entry codes only when entering students for their qualification.	GCSE Double Award – 2MN02
Entry codes	The entry codes are used to: enter a student for the assessment of a unit. aggregate the student's unit scores to obtain the overall grade for the qualification.	Please refer to the Edexcel *Information Manual*, available on the Edexcel website.

Appendix 4 Controlled assessment record sheet Unit 1

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advancing learning, changing lives

GCSE in Manufacturing (Double Award) (5MN01)

	Examination year
Centre name	**Centre number**
Candidate name	**Candidate number**

Unit 1: Designing Products for Manufacture	
a) Analysing the brief	/6
b) Specification — product criteria and material constraints	/6
c) Specification — production requirements and quality standards	/6
d) Ideas and design solutions	/6
e) Testing and selecting the final solution	/6
f) Prototyp	/8
g) Presentation techniques	/6
h) Final review	/6
	Total/50

Declaration of authentication

I declare that the work submitted for assessment has been carried out without assistance other than that which is acceptable under the scheme of assessment.

I also agree to the work being used to support professional development, online support and training of both centre-assessors and Edexcel moderators.

Signed (candidate): _____ Date: _____

Signed (teacher): _____ Date: _____

Name of teacher: _____

Please attach this sheet to the student's work before submitting it to the moderator.

Appendix 5 Controlled assessment record sheet Unit 2

edexcel
advancing learning, changing lives

GCSE in Manufacturing (Double Award) (5MN02)

	Examination year
Centre name	**Centre number**
Candidate name	**Candidate number**

Unit 2: Manufactured Products	
a) Work as part of an effective team	/6
b) Produce a schedule for manufacture	/6
c) Prepare and use materials	/6
d) Prepare and use tools, equipment and machinery	/6
e) Manufacture products to meet requirements	/8
f) Monitor production	/6
g) Use quality control techniques	/6
h) Modify production plan and schedule for manufacture	/6
	Total/50

Declaration of authentication

I declare that the work submitted for assessment has been carried out without assistance other than that which is acceptable under the scheme of assessment.

I also agree to the work being used to support professional development, online support and training of both centre-assessors and Edexcel moderators.

Signed (candidate): _____ Date: _____

Signed (teacher): _____ Date: _____

Name of teacher: _____

Please attach this sheet to the student's work before submitting it to the moderator.

Appendix 6 Assessment criteria descriptor guidance

This section outlines the meaning of the descriptors found within the assessment criteria for Units 1 and 2. It provides further guidance on how to confirm the level of performance when awarding marks.

Descriptor	Meaning
Basic	Essential and fundamental, likely to be in the form of a list with little description or shows little detail
Briefly	Some main points but gives no detail or reasoning
Consistent	Reliable and steady approach
Detail/Detailed	Including most features, elements or facts
Effective	Quickly, confidently
Fully	Covers all aspects
Interpret	Make sense of, or deduce from
Limited	Simple, containing some important features or facts
List	Provide the information in a list, rather than in continuous prose
Key	Features or issues that are important
Main	Features or issues that are most likely to have an impact
Most	The majority with one or two left out
Outline	Provide a clear summary including main features/general principles
Range	At least three
Several	At least three
Significant	Major and noteworthy
Simple	Not likely to contain important features or facts
Some	At least two
Support and guidance	Examples might include (but not limited to): • instructions given verbally telling learners what to do and how to do it, • when carrying out these tasks the learner frequently needs reminding what to do • repeated demonstration of what to do • if they were not guided through each relevant stage the learner would probably not be able to complete the task

Descriptor	Meaning
Limited support and guidance	Examples might include (but not limited to): • the tutor gives a variety of options that the learner decides upon, they discuss how to take the task forward, the learner will then confirm their approach before they commence the activity • after this initial support to start the processes and ensure the learner is safe to do so, the tutor is likely to only react to questions the learner asks • the learner checks matters of detail to ensure they are progressing as needed, possibly on a regular basis, but would be checking for confirmation that they are progressing satisfactory and doing things correctly rather than asking for assistance • occasionally the teacher may have to assist and intervene to ensure actions are progressing satisfactory and correctly
Independence	Examples might include (but not limited to): • initially the teacher will support the learner to ensure they are able and know what they need to do when carrying out the required tasks, although this may be more apparent during the formative assessment stages than with the summative assessment • the learner feels comfortable to carry out the tasks without support, the use of the documentation is done in a confident manner to produce a production plan; the materials, parts and components, tools and equipment they select and use will be those that are most suitable for the task and they will always show due regard to safety • the teacher will monitor and recognise that the learner can carry out the tasks but may on very few occasions have to assist. • learners may occasionally seek confirmation that they are doing things right before they carry out stages of the tasks required

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