

# Contents

## WJEC GCSE in DESIGN & TECHNOLOGY (TEXTILES)

### For Teaching from 2012 For Award from 2014



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**This is a linear specification: all assessments must be taken at the end of the course.**

## DESIGN AND TECHNOLOGY (TEXTILES)

### SUMMARY OF ASSESSMENT

<b>Unit 1: TEXTILES WRITTEN PAPER (40%)</b> <b>Written Paper: 2 hours</b> <b>120 marks (80 UMS)</b> <b>This will consist of one paper for each focus area.</b>
<b>Section A 20% (60 marks)</b>
Four compulsory questions related to the world of Design and Technology and focus area specific.
<b>Section B 20% (60 marks)</b>
Four compulsory questions based on the specification content. These questions share a common structure across all focus areas.
<b>Unit 2: TEXTILES TASK (60%)</b> <b>Controlled Assessment</b> <b>180 marks (120 UMS)</b>
<b>Part A</b> Carry out an analysis of the problem, write a design specification, generate a range of ideas, develop a solution and produce the details of the final solution. (10 guided hours). <b>Part B</b> Plan the making process, carry out the making and evaluate project. (20 guided hours).
Both parts of the task have to comply with the controlled assessment rules.
<b>Focus Areas Provided</b>
Food Technology Graphic Products Resistant Materials Technology Systems and Control Technology Textiles Technology Product Design

#### AVAILABILITY OF ASSESSMENT AND CERTIFICATION

	Entry Code		June 2014 and each year thereafter
	Subject	Option*	
<b>Unit 1</b>	4131	01 or W1	✓
<b>Unit 2</b>	4132	01 or W1	✓
<b>Subject Award</b>	4130	LA or UL	✓

**\* Option Codes**

English Medium 01, Welsh Medium W1 - for units  
English Medium LA, Welsh Medium UL - for subject award

**Qualification Accreditation Number: 500/8133/0**

**This is a linear specification: all assessments must be taken at the end of the course.**

# DESIGN & TECHNOLOGY (TEXTILES)

## 1 INTRODUCTION

### 1.1 Rationale

A course in Design and Technology offers a unique opportunity in the curriculum for candidates to identify and solve real problems by designing and making products or systems in a wide range of contexts relating to their personal interests. Design and Technology develops candidates' interdisciplinary skills, all six Key Skills and their capacity for imaginative, innovative thinking, creativity and independence.

The specification is based upon the view that design and technology is essentially a practical activity involving the combination of skills with knowledge and understanding in order to design and make quality products. It is intended to develop candidates' design and technological capability through a flexible and broad-based approach. The specification is planned to be sufficiently broad, balanced and relevant to interest all candidates.

Candidates should have the opportunity to analyse and evaluate situations, design and make products, and then appraise their performance. They should be provided with the opportunity to work with a range of materials and ICT.

Candidates should be presented with the subject matter in a stimulating and interesting way to promote discussion and research. They should be given the opportunity to experience the variety of roles involved in design and technology; client, designer, maker, manager, user etc. Candidates should be encouraged to consider the relationship between technology and society.

As a fundamental part of their course, candidates should design and make products. They should carry out activities related to industrial practices and the application of systems and control within their designing and making of these products.

The specification allows candidates to work in one or more of the following focus areas:

- Food Technology
- Graphic Products
- Resistant Materials Technology
- Systems and Control Technology
- Textiles Technology
- Product Design

## 1.2 Aims and Learning Outcomes

GCSE specifications in design and technology should encourage learners to be inspired, moved and changed by following a broad, coherent, satisfying and worthwhile course of study and gain an insight into related sectors, such as manufacturing and engineering. They should prepare learners to make informed decisions about further learning opportunities and career choices.

GCSE specifications in design and technology must enable learners to:

- actively engage in the processes of design and technology to develop as effective and independent learners;
- make decisions, consider sustainability and combine skills with knowledge and understanding in order to design and make quality products;
- explore ways in which aesthetic, technical, economic, environmental, ethical and social dimensions interact to shape designing and making;
- analyse existing products and produce practical solutions to needs, wants and opportunities, recognising their impact on quality of life;
- develop decision-making skills through individual and collaborative working;
- understand that designing and making reflect and influence cultures and societies, and that products have an impact on lifestyle;
- develop skills of creativity and critical analysis through making links between the principles of good design, existing solutions and technological knowledge.

## 1.3 Prior Learning and Progression

Although there is no specific requirement for prior learning, this specification builds upon the Programmes of Study for Design and Technology in Key Stages 1-3.

This specification may be followed by any candidate, irrespective of their gender, ethnic, religious or cultural background. This specification is not age specific and, as such, provides opportunities for candidates to extend their life-long learning.

This specification builds upon the Programmes of study for Design and Technology in Key Stages 1, 2 and 3 and allows candidates to fully address the knowledge, skills and understanding required by the National Curriculum Order for Design and Technology. The specification allows candidates to work in the following focus areas: Food Technology; Graphic Products; Resistant Materials Technology; Systems and Control Technology; Textiles Technology and Product Design promoting progression to a deeper level of knowledge, skill and understanding in one of the areas studied at Key Stage 3.

Whilst there is no specific requirement for prior learning in the WJEC Advanced Subsidiary / Advanced GCE specification in Design and Technology, there is a clear progression route from this GCSE specification. Candidates following the Graphic Products; Resistant Materials Technology; Textiles Technology or Product Design focus areas have an opportunity to extend their experience into the Product Design focus area at AS/Advanced level. Food Technology and Systems and Control Technology candidates have a clear progression route into focus areas with the same titles at AS/Advanced.

## 1.4 Equality and Fair Assessment

GCSEs often require assessment of a broad range of competences. This is because they are general qualifications and, as such, prepare candidates for a wide range of occupations and higher level courses.

The revised GCSE qualification and subject criteria have been reviewed to identify whether any of the competences required by the subject presented a potential barrier to any disabled candidates. If this was the case, the situation was reviewed again to ensure that such competences were included only where essential to the subject. The findings of this process were discussed with disability groups and with disabled people.

This review did not identify any potential barriers to disabled candidates within the criteria and no potential barriers have been added within the specification. It should be noted that candidates may use CAD/CAM for the making process and practical assistants may be used to support students with physical disabilities in this process.

Reasonable adjustments are made for disabled candidates in order to enable them to access the assessments. For this reason, very few candidates will have a complete barrier to any part of the assessment. Information on reasonable adjustments is found in the Joint Council for Qualifications document *Regulations and Guidance: Access Arrangements, Reasonable Adjustments and Special Consideration*. This document is available on the JCQ website ([www.jcq.org.uk](http://www.jcq.org.uk)).

Candidates who are still unable to access a significant part of the assessment, even after exploring all possibilities through reasonable adjustments, may still be able to receive an award. They would be given a grade on the parts of the assessment they have taken and there would be an indication on their certificate that not all of the competences have been addressed. This will be kept under review and may be amended in future.

## 1.5 Classification Codes

Every specification is assigned a national classification code indicating the subject area to which it belongs. The classification code for this specification is 9050.

Centres should be aware that candidates 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.

Centres may wish to advise candidates 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 candidates take two GCSE specifications that have different classification codes but have significant overlap of content. Candidates who have any doubts about their subject combinations should check with the institution to which they wish to progress before embarking on their programmes.

## 2

## CONTENT

## DEVELOPING, PLANNING AND COMMUNICATING IDEAS

This part of the specification is concerned with the process of designing. This will start with an initial problem and conclude with a proposed solution giving due consideration to the issues that can and should influence the outcome.

*Candidates should be taught to:*

**(a) develop and use design briefs and detailed specifications;**

Understand the difference between design brief and design specification.  
Analyse and clarify a design brief.  
Identify essential criteria for inclusion in a design specification.  
Use a specification to help develop a design.  
Use a design brief and design specification for evaluation.  
Use existing products as a source of ideas.

**(b) consider issues that affect their research, designing and planning;**

Use different research strategies to find information.  
Consider the needs and values of a range of users.  
Appreciate the economic costs involved.  
Consider issues of sustainability.  
Consider moral, social, environmental and cultural influences.  
Take into account relevant safety legislation.  
Prioritise and summarise research material.  
Recognise the potential of new technologies.  
Consider marketing and advertising.

**(c) be flexible and adaptable in responding to changing circumstances and new opportunities;**

Recognise that there is a range of possible ways forward when designing and making.

**(d) generate, develop, model and communicate design proposals;**

Use a variety of graphic techniques to communicate ideas clearly.  
Use ICT to communicate ideas clearly.  
Use appropriate modelling techniques to develop proposals.  
Develop designs in a progressive way.  
Communicate final design proposals in an appropriate form and level of detail.

**(e) design for manufacturing in quantity;**

Consider how products are designed to facilitate manufacturing in quantity.

**(f) plan work schedules effectively;**

Produce a realistic schedule of work.  
Recognise critical points and constraints.

- (g) match materials and components with tools, equipment and processes, taking account of critical dimensions and tolerances when deciding how to manufacture the product.**

Select and justify the materials, components, tools, equipment and processes needed for successful manufacture.

## PRODUCT ANALYSIS

This part of the specification is about knowing how to analyse a product.

This specification provides the opportunity for candidates, through Textiles to develop a wider understanding of how products are designed and made.

Candidates should be taught to carry out a detailed analysis of a product addressing the following aspects:

- (a) the probable specification for the product;
- (b) the aesthetic appeal of the product;
- (c) the function and/or purpose of the product;
- (d) quality issues relating to the product;
- (e) the size data of the product;
- (f) the safety considerations of the product with reference to the end user;
- (g) the materials used in the manufacture of the product;
- (h) the scale of manufacture used to make the product;
- (i) the commercial processes used to make and assemble the product;
- (j) safety considerations for making the product;
- (k) sustainability and environmental issues.

## SUSTAINABILITY and LEGISLATIVE ISSUES

This part of the specification is about knowing that sustainability and environmental issues, legislation and standards affect and influence designing and manufacturing choices and decisions, and use this information in their own designing and making.

### Sustainability in Design and Technology

Candidates will have to be taught to look at the world in which we live, to consider the needs of future generations and will need to consider how, as designers and manufacturers, they can minimise their environmental impact and also to show in their work how we can have a more sustainable future.

Candidates should be taught to:

- (a) recognise why sustainability issues, environmental issues, are important;
- (b) consider sustainability issues, environmental issues, into account when designing and manufacturing;
- (c) recognise and take into account social, economic and environmental responsibility in designing and making products;

- (d) understand and use the SIX Rs, that is:
- rethink
  - reuse
  - recycle
  - repair
  - reduce
  - refuse.
- (e) understand that sustainable designing is more than using recycled or recyclable materials to manufacture their products. It is about the total impact that the process of designing and making has on the environment;
- (f) carry out a 'Life Cycle Analysis' to determine the environmental impact of a product.

### **Legislative Issues in Design and Technology**

This specification requires candidates to develop an understanding of legislative issues and standards as they affect their designing and making in their chosen focus area and to be able to use the understanding they have gained to guide and assist their decision making during designing.

Candidates should know:

- (a) about the work of the British Standards Institution (BSI) and how it is related to the Committee for European Standardisation (CEN) and the International Standards Organisation (ISO);
- (b) how standards are produced, what they are for and how products that reach the standards are marked:
- Kitemark.
  - C E marking.
  - BEAB used on electrical items such as sewing machines.
- (c) about and apply the current British Standards and tests applicable to Textile products in relation to:
- Clothes sizes.
  - Materials such as colour fastness, flammability, crease Resistance.
  - Care labelling codes using symbols.
  - Components.
  - Children's goods and toys – Lion mark.
- (d) about current legislation in relation to the quality and asafety of products:
- The Trade Descriptions Act.
  - Furniture and Furnishings (Fires Safety) Regulations.

## OTHER DESIGNERS / PRACTITIONERS

This part of the specification is about knowing about and understanding the work of professional designers and/or professional practitioners within the world of Design and Technology.

Candidates should be taught to recognise the influence of two Designers/Practitioners on the world of Design and Technology with respect to:

- (a) the range of work that each of the Designers/Practitioners has produced over time;
- (b) how to identify the work of each of the Designers/Practitioners;
- (c) the innovations and/or new ideas that the two Designers/Practitioners have introduced over time;
- (d) the influence that each of the two Designers/Practitioners has had on the world of Design and Technology.

Each Focus Area will specify two Designers/Practitioners for each examination year and the awarding body will review the two Designers/Practitioners each year. Centres will be informed of the details of each of the Designers/Practitioners two years before the examination to be taken.

## COMMERCIAL MANUFACTURING PRACTICES

In this section, candidates are expected to learn how products can be manufactured in quantity, and that the scale of production is dependent upon the type of product being made. Candidates should be encouraged to consider commercial manufacturing processes within their own designing and making.

Candidates should be taught to:

- (a) **understand how products can be manufactured in quantity;**
  - Know the different methods of manufacture: job production (custom-made or one-off); batch production; mass production and when each is appropriately used.
  - Know that the scale of production depends on the quantity of products required.
  - Understand how manufacturing systems are organised: line production; progressive bundle system; cell production.
  - Appreciate the advantages and disadvantages each manufacturing system to the employer and employee.
  - Appreciate the impact of global manufacturing.

**(b) simulate production and assembly lines including the use of ICT;**

- Scale up a production plan for the production of a batch of simple products.
- Estimate total resources to minimise waste and time.
- Organise a work schedule to reflect efficient quantity production.
- Work to agreed tolerances or parameters.
- Work in a team to produce a batch of simple products e.g. a mobile phone case.

**(c) develop and use different kinds of specification as used in the textile industry;**

- Design specification.
- Fabric specification.
- Product specification.
- Manufacturing specification.

**(d) recognise different types of cutting tools and equipment used in industry and know why they are used;**

Cutting tools:

- Straight knives.
- Round or band knives.
- Automated die cutters for products of constant shapes.
- Computer controlled cutting machines.
- Laser cutters.

Other equipment used for:

- Lay planning and estimating material quantities.
- Fabric spreading to include several plies.

**(e) understand how fashion trends and style are created;**

- Identify the factors which influence changing fashion trends.
- Understand the role of designers, image makers, trendsetters, fashion centres.
- Differentiate between street styles; contemporary fashion; ready to wear (prêt-à-porter); haute couture.
- Understand fashion forecasting and predictions.
- Use of mood boards; design sketches; storyboards; concept sketches and contract designs; final collection ideas.
- Use of prototypes, toiles and sample products.
- Understand the importance of fashion cycles.
- Appreciate the use of marketing and advertising.

## KNOWLEDGE OF MATERIALS AND COMPONENTS

In this section candidates are expected to know about the characteristics, properties and finishes applied to a wide variety of textiles materials. They need to be aware of technological developments within the textile industry. Candidates should be encouraged to apply their knowledge and understanding of materials and components when designing and making textile products.

Candidates should be taught:

**(a) that textile materials are made by different construction methods, and that their advantages and disadvantages affect end use;**

- Weaving: plain, twill, satin, herringbone, pile.
- Knitting: weft knit and a warp knit.
- Bonding: sticking with adhesives; heating thermoplastic fibres; stitching a web of fibres.
- Laminating.
- Felting.

**(b) that fibres are the raw material of textiles and that they can be classified according to their source;**

*Natural polymers:*

- Animal polymers: wool/fleece – mohair, cashmere, angora, alpaca, camel (hair).
- Insect polymers: silk.
- Plant polymers: cotton, linen, hemp, jute.

*Manufactured polymers:*

- Natural: rayon, viscose, rubber, metal, glass.
- Synthetic: polyester, polypropylene, nylon, elastane, lycra, aramid fibres.
- Microfibres – Tactel, Tencel (Lyocell).

**(c) how materials can be combined and processed to create more useful properties and how these affect end use;**

- The nature of staple and continuous filaments; textured yarns; novelty yarn (chenille) and that these determine fabric weight, flexibility, handle and end use.
- The properties of the main natural and manufactured fibres/fabrics including: strength, elasticity, absorbency, durability, insulation, flammability, water repellency, anti-static and resistance to acid, bleach, sunlight.
- Blending and mixing fibres improves the properties and uses of yarns and materials.
  - Blends: polyester and cotton, silk and viscose, hemp and cotton or silk.
  - Mixture: cotton and wool, lycra with wool, cotton or nylon.
  - Bonding breathable water proof membranes to outer fabrics for all-weather wear (Gore-Tex, Permatex).
  - Bonding foam to knitted or woven fabrics.
  - Bonding plastic to loosely woven cotton to simulate leather.
  - Quilting – polyester wadding between an outer and lining material.

- The advantages of textile fabrics which are combined as laminates in: clothing apparel, interior furnishing, industrial uses, including geotextiles, agriculture and medical.

**(d) the importance of new technologies including Micro and Nano-Technology in fibre and material production for a range of textile products;**

- Smart fibres and fabrics that respond to the environment or stimuli:  
Micro-encapsulation.  
Photochromic properties.  
Thermochromic properties.
- Interactive textiles that function as electronic devices and sensors:  
Circuits integrated into fabrics such as heart rate monitors.  
Wearable electronics such as mobile phones or music player.  
Wearable electronics integrated into the fabric itself.
- The impact of biotechnology.
- Micro fibres in clothing manufacture.
- Breathable materials.
- Sun protective clothing.
- Kevlar (used in cables for civil engineering – modular compression engineering); recycling PET bottles into fleece fabrics.
- carbon fibres.
- Nomex.
- Geotextiles for landscaping.
- Rhovyl as an antibacterial fibre.

**(e) about a variety of finishing processes and why they are important for aesthetic and functional reasons;**

Different methods of enhancing the appearance, prolonging and protecting life.

- To enhance aesthetic quality:  
Colouring, surface decoration, embossing, glazing, moiré effect, stiffening, increasing lustre (calendering, mercerising), brushing, stain resistance (Scotchguard Teflon).
- To enhance fabric life:  
Flame retardant, moth proofing.
- To improve functionality:  
Shower proofing using PVA or PVC or wax; crease resistance using resin; waterproofing using silicones; shrink resistance using chlorine treatment; anti-static finish, coating with PVC, neoprene, silicone rubber, polyurethane; use of barrier membranes laminated to an outer or inner shell to make them breathable yet water proof; windproof materials made by very close weave construction.

- Different methods of dyeing and decorating materials in school, **and** in industry:

Dyeing: piece, dip, random, tie and dye, batik.

Printing: silk screen, roller, discharge, block, burn out; stencilling; marbling; air brushing.

Painting: felt tip, dimensional, fabric paint, silk paints.

Transfers: image-maker, ink-jet transfer (CAM).

Embroidery: hand embroidery, machine embroidery, CAM.

Appliqué; beadwork; patchwork.

- Developing pattern formation for transfer onto material:

Explore design sources for shape, colour, texture, movement, form, symmetry and line using both natural and man-made structures as well as the cultural influences of other people.

- Develop full drops, half drops, brick, repeat patterns; borders, panels, stripes and abstracts using ICT and other graphic media.

**(f) that to achieve the optimum use of materials and components, they need to take into account the relationship between material, form and intended manufacturing processes;**

- Choose materials and components as determined by:

Aesthetic qualities – colour, pattern, texture, finish, transparency, lustre weight.

Physical characteristics - weave, density, drape, extensibility.

Economic considerations – fibre content, directional pile, cost, pattern; standard widths 90cm, 115cm, 150cm, 200cm, 240cms.

Performance properties – strength, durability, safety, stretch, absorbency, wind/water proof, insulation, anti-static.

- Develop and use pattern templates and lay plans for cutting out.
- Identify and use specific construction processes in relation to type of fabric and the intended purpose of the product:

Joining – seams: plain, french, double stitched, lapped, over locked.

Shaping – darts, tucks, gathers, pleats, casings (draw cord/elastic).

Finishing edges – hems, facings, frills, piping, binding.

- Identify and use style details which **reflect current trends** and which are appropriate to the type of fabric and intended purpose of the product:

Sleeves: raglan, set-in, dolman, gathered, short/long.

Necklines: square/round, sweetheart, boat.

Collars: tunnel, sailor, shirt, rever, roll, shawl.

Pockets: patch, welt, shaped, in side seam.

Fastenings: zips, buttons, buckles, Velcro, eyelets, ties, poppers.

Pleats: knife, box, inverted, kick.

## TOOLS, EQUIPMENT AND MAKING

Candidates are expected to select, set up and use a range of tools and equipment safely prior to manufacture. Candidates should be encouraged to develop their manufacturing capability through a wide range of practical tasks, observing quality control checks throughout the manufacturing process in order to make quality products.

Candidates should be taught to:

**(a) select and use tools, equipment and processes effectively and safely to make products that match a specification;**

- Select and use the correct materials, hand tools and equipment for a range of practical tasks such as template production; stencil preparation; cutting out and assembly.
- Know how to set up and adjust equipment safely: such as sewing machines, irons, printing equipment; stencil preparation areas.
- Know how to change accessories when appropriate for special processes e.g. using a zipper foot for piping.

**(b) use a range of industrial applications when working with familiar materials and processes;**

- Reflect, where possible, industrial manufacturing processes for example, stitch, trim and neaten seams with the over locker.
- Use CAD/CAM equipment for cutting templates accurately and continuously.

**(c) manufacture single products and products in quantity, applying quality assurance techniques;**

- Develop and use a manufacturing specification.
- Develop and use a manufacturing plan.
- Apply quality control techniques during preparation and manufacture to include:
  - Visual checks in raw materials and components.
  - Use of pattern language and markers for lay plans.
  - Visual checks for pattern drop/match.
  - Correct choice of materials for end use in products.
  - The importance of accuracy and working to a tolerance - correct use of seam tolerances in joining/trimming.
  - Correct use of thread-colour, type, shade, stitch length.
  - The appropriate choice of construction and decorative processes for fabric type and product end use.
- Apply quality assurance techniques on completion of the product.
- Ensure, through testing and modification, that the quality of the product is suitable for the intended purpose.

**(d) devise and apply tests to check the quality of their work at critical points during development;**

- Ensure through testing and modification, that the quality of the product is suitable for the intended purpose.
- Reflect on procedures for testing materials in school and how these may be different in industry.
- Use comparable tests for:
  - Flammability.
  - Absorbency.
  - Insulation.
  - Durability.
  - Elasticity.
  - Extensibility (stretch).
- Use the basic procedures for lay planning and use of pattern language.
  - Lengthwise / crosswise folds.
  - Cutting on the cross or bias.
  - Notches, grain lines, balance marks, tuck/pleat lines, dart markings, positions for pockets, buttons / holes, centre front / back lines, seam tolerance.
- Use different methods of transferring important marks onto material prior to product manufacture.
  - Use of tailors chalk; seam and tailor tacking.
  - Use of hot notch marking in industry.

**(e) recognise the difference between quality of design and quality of manufacture, and use essential criteria to judge the quality of other people's products;**

- Identify criteria to analyse the quality of existing products in terms of both design and manufacture.
- Develop technological understanding through the study of a wide range of products and applications.

**(f) ensure that their products are of a suitable quality for intended users;**

- Provide a detailed, objective evaluation of the final product, including wearer trials, views of target audience.

**ICT, CAD, CAM**

Textiles Technology candidates are expected to use computer systems with appropriate software and hardware to support their designing and manufacturing. They need to be able to use ICT systems to assist research for problem solving, to process text and to analyse and present data.

Candidates should be taught to:

- (a) use ICT to support their designing and manufacturing;**
- Use word processing software to create and edit text and to check spelling and grammar.
  - Use spreadsheet software to collate numerical data and create graphs and charts.
  - Access the internet and world wide web, to collect information.
  - Use appropriate CAD software to develop and present ideas.
  - Consider advantages and disadvantages of using CAD.
- (b) Appreciate the ways in which a computerised machine can be used in batch or volume production;**
- Appreciate the advantages and disadvantages of the use of CAM.
  - Appreciate how CAM equipment can be used in a variety of applications in textiles:
    - For cutting templates accurately and continuously.
    - In the preparation of printing blocks.
    - For manufacturing a logo/motif on a range of material types.

## SYSTEMS AND PROCESSES

In this section candidates are expected to understand what the concept of a system and the importance of feedback in controlling systems.

Candidates should be taught to:

- (a) understand the concepts of input, process and output;**
- Analyse familiar products in term of input, process and output. Understand why feedback is important in some systems.
  - Analyse the nature of systems in products used every day: sewing machine, computer, CAD/CAM equipment, iron, batik pot.
  - Analyse the nature of production systems: fibre/yarn/fabric production, design development, product manufacture.
  - Write a flow chart for the production of a textile item using correct graphic symbols for input, process, decision, output, beginning / end
- (b) understand how control systems and sub-systems can be designed, used and connected to achieve different purposes;**
- Know that systems can be made up of several sub-systems.
  - Understand how Computer Integrated Manufacture (CIM) operates.
- (c) understand how feedback is incorporated into systems;**
- Describe how feedback is incorporated into a system.
  - Understand the importance of feedback in controlling systems.
- (d) know how to analyse the performance of systems;**
- Be able to analyse the efficiency of common systems.
  - Analyse electrical, electronic, manual hydraulic, robotic systems of moving products, information or people around an organisation.

# 3

## ASSESSMENT

### 3.1 Scheme of Assessment

Assessment for GCSE **Textiles** is untiered, i.e. all components/units cater for the full range of ability and allow access to grades A\*-G for the subject award.

The scheme of assessment will consist of:

#### UNIT 1: TEXTILES WRITTEN PAPER

##### Written Paper 2 hours (40 %)

Candidates will be required to sit an examination of two hours' duration (split into two sections), set and marked by the WJEC. Specific papers will be set for each of the six focus areas.

The papers for all focus areas follow a similar structure. Section 1 is designed to be answered in 60 minutes and consists of four questions. These questions are set so as to be accessible to candidates from all focus areas and will relate to Product Analysis, Overarching Principles, Designers and Practitioners and The Design Process. The quality of written communication will be integrated into question 3 and will necessitate paragraphs or essay style responses. Section 2 consists of four questions: these are focus area specific, and designed to take 60 minutes to answer.

Differentiation will be achieved by using a variety of styles of questioning to ensure that specification content is tested in such a way as to provide a meaningful examination to candidates of different levels of ability. The principle of incline of difficulty will be built into questions so that the examination will provide an adequate test across the targeted ability range.

#### UNIT 2: TEXTILES TASK

##### Controlled Assessment 30 hours (60%)

The WJEC is responsible for 'task setting' and details of the controlled assessment tasks for Design and Technology will be forwarded to all centres in September each year.

Candidates are required to complete one 30 hour design, make and evaluate task. The task is divided into two sections. Section A is concerned with designing the product and Section B is concerned with planning, making and evaluating the product. The task is time limited and teachers are required to monitor and verify this time limit. Candidates will not gain additional credit by exceeding the time limit. Further details of the assessment process can be found in section 5.

### 3.2 Assessment Objectives

Candidates will be required to demonstrate their ability to:

**AO1** Recall, select and communicate their knowledge and understanding in design and technology including its wider effects.

**AO2** Apply knowledge, understanding and skills in a variety of contexts and in designing and making products.

**AO3** Analyse and evaluate products, including their design and making.

### 3.3 Weighting of Assessment Objectives

Assessment objectives are weighted as follows across the two units:

	Unit 1 (Written Paper) %	Unit 2 (Controlled Assessment %	Total %
AO1	26.66	3.33	30
AO2	6.66	48.33	55
AO3	6.66	8.33	15
Total	40	60	100

### 3.4 Quality of Written Communication

For components involving extended writing (Written paper) candidates will be assessed on the quality of their written communication within the overall assessment of that component.

Mark schemes for these components include the following specific criteria for the assessment of written communication:

- legibility of text; accuracy of spelling, punctuation and grammar; clarity of meaning;
- selection of a form and style of writing appropriate to purpose and to complexity of subject matter;
- organisation of information clearly and coherently; use of specialist vocabulary where appropriate.

**4****AWARDING, REPORTING AND RE-SITTING**

GCSE qualifications are reported on an eight point scale from A\* to G, where A\* is the highest grade. The attainment of pupils who do not succeed in reaching the lowest possible standard to achieve a grade is recorded as U (unclassified) and they do not receive a certificate.

This is a linear specification in which all assessments must be taken at the end of the course. Where candidates wish to re-sit, external components must be re-taken. The controlled assessment component may also be re-taken according to guidelines given in 'Administration of Controlled Assessment'. Alternatively, the UMS mark for this component may be carried forward for aggregation with the external components when these are re-taken.

Individual unit results are reported on a uniform mark scale (UMS) with the following grade equivalences:

GRADE	MAX.	A*	A	B	C	D	E	F	G
Unit 1	80	72	64	56	48	40	32	24	16
Unit 2	120	108	96	84	72	60	48	36	24
Subject Award	200	180	160	140	120	100	80	60	40

## 5 ADMINISTRATION OF CONTROLLED ASSESSMENT

The WJEC GCSE Design and Technology specification meets all regulations for controlled assessment as laid down by the regulatory authorities.

**The controlled assessment task is worth 60% of the total marks** available for the specification.

The controlled assessment tests all the assessment objectives for GCSE Design and Technology, within the weightings stipulated by the regulatory authorities.

Candidates will be required to demonstrate their ability to:

**AO1** Recall, select and communicate their knowledge and understanding in design and technology including its wider effects.

**AO2** Apply knowledge, understanding and skills in a variety of contexts and in designing and making products.

**AO3** Analyse and evaluate products, including their design and making.

The weighting of assessment objectives across examination components is as follows:

	AO1	AO2	AO3	Total
<b>Controlled Assessment</b> (Marks and Percentages)	<b>10</b> <b>(3.3%)</b>	<b>145</b> <b>(48.3%)</b>	<b>25</b> <b>(8.33%)</b>	<b>180</b> <b>(60%)</b>

### Rationale for Controlled Assessment

**The controlled assessment is a compulsory component of GCSE Design and Technology.** It complements the external examination by offering a distinct means of assessment. It is important for a number of reasons.

It enables candidates to:

- design creatively by generating, developing, planning and communicating ideas;
- make products by working safely with tools, equipment, components, materials and ingredients;
- apply systems and control. CAD/CAM, digital media and new technologies appropriate to the focus area;
- analyse and evaluate processes and products.

## Levels of Control

The regulation of controlled assessment in GCSE Design and Technology is split into three stages:

- task setting
- task taking
- task marking

For each stage, the regulatory authorities have specified a certain level of control to ensure authenticity and reliability.

### A. Task setting (High level of control)

The WJEC is responsible for **task setting** and details of the controlled assessment tasks for Design and Technology will be forwarded to all centres in September each year. Three tasks will be offered for each focus area. Candidates will choose one of these tasks. These tasks will be reviewed on a one-year cycle. The tasks will be open to interpretation and contextualisation by the centre/candidate.

### B. Task taking (Medium level of control)

Candidates are required to complete one 30 hour design, make and evaluate task. The task is divided into two sections. Section A is concerned with designing the product and Section B is concerned with planning, making and evaluating the product. The task is time limited and teachers are required to monitor and verify this time limit. Candidates will not gain additional credit by exceeding the time limit. **Section A** of the task is to be completed in **10 hours** supervised time and **Section B** of the task is to be completed in the remaining **20 hours** of supervised time.

#### Supervision

The task must be supervised in such a way as to ensure that the contributions of individual candidates are recorded accurately and that plagiarism does not take place.

The task can be carried out in the normal classroom/workshop environment. Candidates are allowed supervised access to resources that may include information gathered outside the 30 hours of controlled assessment time.

Candidates may gather research/inspirational material prior to or during the assessment period and this can be referred to during the task but this material is not to be included in the material to be assessed. **Graphical work which has been prepared in advance by the candidate as part of an ongoing workbook or research cannot be included as part of the material assessed for the control assessment task.**

Candidates may collaborate/confer with others in relation to the task but all assessed material must be the candidates' work only.

The supervising teacher can give candidates limited guidance during the task in order to clarify what is to be done and to ensure that safe working practices are adhered to.

It is the responsibility of the centre to ensure the reliability and authenticity of all work presented for this controlled assessment. Teachers and students will be required to sign a declaration that all work presented is the work of the candidate alone. Failure to authenticate the work may result in grades being delayed or refused.

### Presentation

All graphical and written work entered for this controlled assessment must be submitted on the pre-printed pages which are available for download from the WJEC website. Candidates are free to use ICT applications where they are appropriate. The assessment criteria for the task are detailed in section 3.

## C. Task marking

The Task is to be assessed as follows.

### Section A Designing

10 hours (60 marks) (Weighting 20%)

	Marks	Assessment objective
Analysis of the task	5	AO3
Design specification	5	AO2
Generation of ideas	10	AO2
Development and modelling Form/style/function (5) Materials/components (5) Construction/making (5) Size/quantity (5) Finish/quality (5)	25	AO2
Final solution – graphical presentation	5	AO1
Final solution – technical details	5	AO2
Creative thinking	5	AO2
Total marks	60	

### Section B Planning, Making and Evaluating

(20 hours) (120 marks) (Weighting 40%)

	Marks	Assessment objective
Plan the make	10	AO1(5) AO2(5)
Making Range and difficulty of processes (10) Quality of construction (25) Dimensional accuracy (15) Quality of finish/appearance (15) Function (10 marks) Independent working (15)	90	AO2
Evaluation	10	AO3
Improvements	10	AO3
Total marks	120	

**Internal Moderation**

Teachers are responsible for marking the controlled assessment by applying the criteria provided. In centres where more than one teacher is involved in a focus area and/or in centres where there is more than one focus area being taught it will be beneficial if the marking criteria are discussed before marking takes place so that some agreement on the application of the criteria can be arrived at. It is essential also that a system of cross moderation between teachers is applied before final marks are submitted to the WJEC.

**Annotation**

There is an opportunity on each page of the task for teachers to make some notes that support the marks being awarded and to record any information that may have some bearing on the candidates' performance. A note of the time taken is also recorded on each sheet.

**External Moderation**

All candidates' marks are recorded on the appropriate form and those marks are submitted in the summer term. The WJEC will select a sample of work that will be moderated externally. A visiting moderator will moderate this sample of work. This external moderation will take place **at the centre**.

WJEC's *Internal Assessment Manual* gives instructions about selecting and despatching samples of work to the moderator.

As a result of the moderation, the marks of candidates may be adjusted to bring the centre's marks into line with the national standard.

It assists the moderation process considerably if the final marks of all the candidates are submitted to the moderator in rank order. It is only if this is done that the moderator can be fully aware of the full impact of any scaling.

In the event of concern over the awarding procedures, the normal appeals process will apply.

**Authentication**

Candidates will be required to confirm in writing, with any exceptions stated, that the work has been completed unaided. This will be achieved by signing the Controlled Assessment box on the pre-printed sheet.

Teachers will be required to confirm in writing that, to the best of their knowledge, all the work submitted for moderation, with any exceptions stated, is the candidate's own unaided work. This will be achieved by signing the composite mark sheet and the Controlled Assessment sheet.

Malpractice discovered prior to the candidate signing the declaration of authentication need not be reported to WJEC but must be dealt with in accordance with the centre's internal procedures.

Before any work towards the Controlled Assessment is undertaken, the attention of candidates should be drawn to the relevant JCQ Notice to Candidates. This is available on the JCQ website ([www.jcq.org.uk](http://www.jcq.org.uk)) and included in *Instructions for Conducting Coursework/Portfolios*. More detailed guidance on the prevention of plagiarism is given in *Plagiarism in Examinations; Guidance for Teachers/Assessors* also available on the JCQ website.

Material that candidates may have acquired in their research such as multiple copies of questionnaires and pre-printed material should not be submitted.

### **Retention of Controlled Assessment**

Centres need to retain the Controlled Assessments until the end of November following the Summer Examination.

## **Details of assessment criteria**

The assessment criteria provided should be applied to each controlled assessment task and are applicable to all focus areas in Design and Technology. The mark descriptors provide a general indication of the performance of candidates in each mark range.

## **Section A Designing**

### **Analysis of the task (5 marks)**

This is an opportunity for candidates to define and contextualise the task in their own terms and to formulate an appropriate initial design brief. Candidates are free to carry out any research they consider necessary but the work presented for assessment will be confined to a summary of how their product sits in the market place together with an evaluation of a similar or competitor's product.

<b>Mark</b>	<b>Description of Attainment</b>
0	No analysis presented.
1	There is a very basic analysis of where the product fits in the market place together with a limited evaluation of a similar product. The work presented shows little evidence of prior research and preparation. A simple brief may be evident.
2	There is a basic but appropriate analysis of where the product fits in the market place together with a basic evaluation of a similar product. The work presented shows limited evidence of prior research and preparation. A simple brief is evident.
3	There is a good analysis of where the product fits in the market place together with an evaluation of a similar product. The work presented shows some evidence of prior research and preparation. A clear brief is evident.
4	There is a very good analysis of where the product fits in the market place together with a detailed evaluation of a similar product. The work presented shows good evidence of prior research and preparation. A well-worded brief is evident.
5	There is a comprehensive analysis of where the product fits in the market place together with a very detailed evaluation of a similar product. The work presented shows clear evidence of detailed research and preparation. A clear and appropriate brief is evident.

**Design Specification (5 marks)**

This is an opportunity for candidates to present a detailed design specification of the intended product.

<b>Mark</b>	<b>Description of Attainment</b>
0	No specification presented.
1	A design specification comprising a list of basic attributes for the product. The specification shows little or no links with the analysis of the task. Information is poorly organised, little or no use of technical language/vocabulary. Written communication is limited in terms of organisation of material, with many errors of grammar, punctuation and spelling.
2	A basic design specification comprising a list of relevant attributes for the product. The specification shows superficial links with the analysis of the task. Information shows evidence of structure, limited use of technical language/vocabulary. Written communication is limited in terms of organisation of material with some errors of grammar, punctuation and spelling.
3	A good design specification comprising a prioritised list of attributes for the product presented under appropriate headings. The specification illustrates clear links with the analysis of the task. Information is organised, basic use of technical language/vocabulary. Written communication is adequate in terms of organisation of material, with some errors of grammar, punctuation and spelling.
4	A comprehensive design specification comprising a prioritised list of attributes for the product presented under appropriate headings. The specification demonstrates strong links with the analysis of the task. Information is well organised, good use of technical language/vocabulary. Written communication is good, presenting mainly appropriate material in a coherent manner, with few errors of grammar, punctuation and spelling.
5	An excellent design specification comprising a prioritised list of attributes for the product presented under appropriate headings. The specification is well founded in the analysis of the task. Information is well organised, presented in a highly appropriate manner, very good use of technical language/vocabulary. Written communication is good, presenting appropriate material in a coherent manner, and largely error-free.

### Generation of ideas (10 marks)

This is an opportunity for candidates to present up to four initial design ideas for the product. Ideas are to be clearly sketched and annotated.

<b>Mark</b>	<b>Description of Attainment</b>
0	No ideas presented. No evidence of written communication.
1 - 2	A small range of barely appropriate ideas that are poorly annotated. The ideas and annotation show little attention to the specification. Information is poorly organised, little or no use of technical language/vocabulary. Written communication is limited in terms of organisation of material, with many errors of grammar, punctuation and spelling.
3 - 4	A range of appropriate ideas that are annotated. The ideas and annotation show some attention to the specification. Information shows evidence of structure, limited use of technical language/vocabulary. Written communication in terms of organisation of material with some errors of grammar, punctuation and spelling.
5 - 6	A range of clear ideas that are appropriately annotated. The ideas and annotation show some attention to the specification. Information is organised, basic use of technical language/vocabulary. Written communication is adequate in terms of organisation of material, with some errors of grammar, punctuation and spelling.
7 - 8	A range of good initial ideas that are well annotated. The ideas and annotation show good attention to the specification. Information is well organised, good use of technical language/vocabulary. Written communication is good, presenting mainly appropriate material in a coherent manner, with few errors of grammar, punctuation and spelling.
9 - 10	A range of excellent initial ideas that are very well annotated. The ideas and annotation show close attention to the specification. Information is well organised, presented in a highly appropriate manner, very good use of technical language/vocabulary. Written communication is good, presenting material in a coherent manner and largely error-free.

**Development and modelling (25 marks)**

This is an opportunity for candidates to choose their best idea and to develop it into its final form. This section is an opportunity for candidates to use appropriate ICT. Marks are awarded for evidence of development under the headings shown. Candidates must offer options and make reasoned decisions under each heading. Evidence of these areas may be presented in integrated form across the 5 pages available.

**Form/Style/Function**

<b>Mark</b>	<b>Description of Attainment</b>
0	No development of form presented.
1	Limited evidence of the form/style being developed or modelled. An alternative shape or style may be evident. There is no evidence of decision-making.
2	Some evidence of the form/style being developed or modelled. Several options are presented. There is evidence of decision-making but with little reasoning offered.
3	Clear evidence of the form/style being developed or modelled. Several options have been offered. There is evidence of reasoned decision-making.
4	Good evidence of the form/style being developed and modelled. Several appropriate options have been offered. There is clear evidence of informed decision making.
5	A variety of forms/styles have been presented and the shape and form of the product have been developed and modelled in a progressive way. A final decision based on sound reasoning has been made.

**Materials/Components**

<b>Mark</b>	<b>Description of Attainment</b>
0	No development of materials/components presented.
1	Limited evidence of the selection of appropriate materials/components. Materials/components have been stated. There is no evidence of decision-making.
2	Some evidence of the selection of appropriate materials/components. Alternatives have been offered. There is some evidence of decision-making.
3	Clear evidence of the selection of appropriate materials/components. Alternatives have been offered. There is evidence of reasoned decision-making.
4	Clear evidence of the selection of appropriate materials/components. Appropriate alternatives have been offered. There is clear evidence of reasoned decision-making.
5	Full and clear evidence of the selection of appropriate materials/components. Appropriate alternatives have been offered. There is evidence of well-reasoned decision-making.

### **Construction/Making**

<b>Mark</b>	<b>Description of Attainment</b>
0	No development of the construction/making presented.
1	Limited evidence of the construction/making being developed. A construction/making method has been offered. There is no evidence of decision-making.
2	Some evidence of the construction being developed. A small variety of construction/making methods have been offered. There is some evidence of decision-making.
3	Clear evidence of the construction/making being developed. A variety of construction/making methods have been offered. There is evidence of reasoned decision-making.
4	Clear evidence of the construction/making being developed. A variety of appropriate construction/making methods have been considered. There is evidence of well-reasoned decision-making.
5	Full and clear evidence of the construction/making being developed. A range of appropriate construction/making methods has been considered. There is evidence of well-reasoned decision-making.

### **Size/Quantity**

<b>Mark</b>	<b>Description of Attainment</b>
0	No development of size/quantity presented.
1	Limited evidence of sizes and or quantities being developed. Sizes or quantities may be evident. There is no evidence of decision-making.
2	Some evidence of sizes and or quantities being developed. Alternative sizes and or quantities will be evident. There is some evidence of decision-making.
3	Clear evidence of sizes and or quantities being developed. Alternative sizes and or quantities will be evident. There is evidence of reasoned decision-making.
4	Clear evidence of sizes and or quantities being developed. Sizes and or quantities have been developed in a progressive way. There is evidence of reasoned decision-making.
5	Full and clear evidence of sizes and or quantities being developed. Alternative sizes and or quantities have been systematically evaluated. There is clear evidence of well-reasoned decision-making.

**Finish/Quality**

<b>Mark</b>	<b>Description of Attainment</b>
0	No development of finish/quality presented.
1	Limited evidence of the development of finish/quality. A suitable finish may be offered. There is no reference to quality control. There is no evidence of decision-making.
2	Some evidence of the development of finish/quality. An alternative finish is offered. There is brief reference to quality control. There is evidence of decision-making.
3	Some evidence of the development of finish/quality. Alternative finishes are offered. There is reference to aspects or quality control. There is evidence of decision-making.
4	Clear evidence of the development of finish/quality. Alternative finishes are offered. There is reference to aspects of quality control. There is evidence of reasoned decision-making.
5	Full and clear evidence of the development of finish/quality. A range of alternative finishes is offered. There is reference to a variety of quality control issues. There is evidence of well-reasoned decision-making.

**Final solution**

This is an opportunity for candidates to give full details of their final design using presentation techniques appropriate to the chosen focus area. Details of the form, dimensions, construction, components, materials and finish will be included as appropriate. This section is an opportunity for candidates to use appropriate ICT. Marks are awarded for (a) a graphical presentation of the final design and (b) The technical details that support manufacture.

**(a) Graphical presentation (5 marks)**

This is an opportunity for the candidate to present a clear and expressive graphical presentation of their final design. Any appropriate method of communication may be used.

<b>Mark</b>	<b>Description of Attainment</b>
0	No graphical presentation presented.
1	A basic illustration of the final product. It is recognisable but lacks proper form. It offers little evidence of shading or colour rendering.
2	An illustration of the final product. It is recognisable and shows reasonable form. It offers evidence of shading and/or colour rendering.

- |   |   |
|---|---|
| 3 | A clear illustration of the final product. It is recognisable and shows good form. It offers evidence of good shading and/or colour rendering.  |
| 4 | A very good graphical presentation of the final product. It uses a recognised graphical technique, is accurate in its structure and It shows effective shading and or colour rendering.       |
| 5 | A very high quality graphical presentation of the final product. It uses a recognised graphical technique, is accurate in its structure and shows expressive shading and/or colour rendering. |

**(b) Technical details (5 marks)**

This is an opportunity for candidates to present the final technical details of their design. These could include dimensions, materials/components, construction and finish as appropriate to each focus area.

<b>Mark</b>	<b>Description of Attainment</b>
0	No technical details presented.
1	Limited evidence of technical detail.
2	Evidence of some technical detail.
3	Evidence of many technical details.
4	Evidence of most technical detail.
5	Evidence of virtually all technical details.

**Creative thinking (5 marks) (Throughout)**

This is an opportunity for candidates to show a measure of flair, imagination and creativity in their designing. It can be evident at any stage through the design process.

<b>Mark</b>	<b>Description of Attainment</b>
0	No creative thinking presented.
1	Evidence of limited creative thinking.
2	Evidence of some creative thinking.
3	Evidence of creative thinking in several areas.
4	Evidence of much creative thinking. Some ideas show imagination and flair. Creative thinking is evident throughout the development of the product and imaginative presentational techniques are evident.
5	A high level of creative thinking. Very imaginative ideas are evident. A highly creative development of the product is evident. Presentational techniques show much flair.

## Section B Planning, making and evaluating

### Planning the make (10 Marks)

This is an opportunity for the candidate to plan the stages and processes necessary to manufacture the product. It must be done before the candidates begins making.

Mark	Description of Attainment
0	No plan for making presented. No evidence of written communication.
1 - 2	A list of manufacturing steps is evident but shows little appreciation of the work involved or the time needed. Information is poorly organised, little or no use of technical language/vocabulary. Written communication is limited in terms of organisation of material, with many errors of grammar, punctuation and spelling.
3 - 4	A list of basic manufacturing steps is evident. The steps contain some detail of the processes required. There is little attempt to quantify the time needed. Information is organised, basic use of technical language/vocabulary. Written communication is limited in terms of organisation of material with some errors of grammar, punctuation and spelling.
5 - 6	A list of realistic manufacturing steps is evident. The steps contain some detail of the processes required. There is an attempt to quantify the time needed. Information is organised, with basic use of technical language/vocabulary. Written communication is adequate in terms of organisation of material with some errors of grammar, punctuation and spelling.
7 - 8	A list of realistic manufacturing steps is evident. The steps contain some detail of the processes required and note any constraints. There is a realistic estimate of the time needed to manufacture the outcome. Information is well organised, with good use of technical language/vocabulary. Written communication is good, presenting mainly appropriate material in a coherent manner, with few errors of grammar, punctuation and spelling.
9 - 10	A clear, appropriate and detailed list of manufacturing steps is evident. Constraints have been recognised. There is a realistic estimate of the time needed to manufacture the outcome. Information is well organised, presented in a highly appropriate manner, with very good use of technical language/vocabulary. Written communication is good, presenting appropriate material in a coherent manner, and largely error-free.

**Making the product (90 marks)**

This is an opportunity for candidates to demonstrate the range and quality of their manufacturing skills. The 90 marks available for making are apportioned under the following headings.

**Range and difficulty of practical processes (10 marks)**

<b>Mark</b>	<b>Attainment</b>
0	No practical processes evident.
1 - 2	One straightforward practical processes are evident.
3 - 4	One or two more demanding practical processes are evident.
5 - 6	A range of fairly demanding practical processes are evident.
7 - 8	A range of demanding practical processes are evident.
9 - 10	A range of challenging practical processes are evident.

**Quality of construction/making (25 marks)**

<b>Mark</b>	<b>Attainment</b>
0	No practical processes evident.
1 - 5	Little acceptable accuracy is evident in the construction/making.
6 - 10	An adequate level of accuracy is evident in only a few aspects of the construction/making.
11 - 15	An adequate level of accuracy is evident in some aspects of the construction/making.
16 - 20	A good level of accuracy is evident in all aspects of the construction/making.
21 - 25	A high level of accuracy is evident in all aspects of the construction/making.

**Dimensional accuracy (15 marks)**

<b>Mark</b>	<b>Attainment</b>
0	No practical processes evident.
1 - 3	The finished product bears little resemblance to the final design proposal.
4 - 6	The finished product matches some details, both visual and technical, of the final design proposal.
7 - 9	The finished product matches many details, both visual and technical, of the final design proposal.
10 - 12	The finished product matches most details, both visual and technical, of the final design proposal.
13 - 15	The finished product matches virtually all details, both visual and technical, of the final design proposal.

**Quality of finish/appearance (15 marks)**

<b>Mark</b>	<b>Attainment</b>
0	No practical processes evident.
1 - 3	No elements of the product displays an adequate finish.
4 - 6	Some elements of the product display an adequate finish.
7 - 9	Most elements of the product display an adequate finish.
10 - 12	Most elements of the product display a good finish.
13 - 15	Great care is taken to achieve a very high quality finish on all elements of the product.

**Function (10 marks)**

<b>Mark</b>	<b>Attainment</b>
0	The product does not function on any level.
1 - 2	The product functions in a very limited or partially finished way.
3 - 4	The product functions to a limited extent.
5 - 6	The product functions fairly well.
7 - 8	The product functions well.
9 - 10	The product functions perfectly.

**Independent working (15 marks)**

<b>Mark</b>	<b>Attainment</b>
0	The candidate cannot work without constant support and advice.
1 - 3	The candidate has required considerable support and advice during the making of the product.
4 - 6	The candidate has required fairly frequent support and advice during the making of the product.
7 - 9	The candidate has required some support and advice during the making of the product.
10 - 12	The candidate has required only minor support and advice during the making of the product.
13 - 15	The candidate has worked almost entirely unaided whilst making the product.

**Evaluation (10 marks)**

This is an opportunity for the candidate to evaluate the final product and to suggest any improvements that could be made. Evaluations must compare the final outcome with the initial intention.

**Evaluation of practical outcome (10 marks)**

<b>Mark</b>	<b>Attainment</b>
0	No evaluation presented. No evidence of written communication.
1 - 2	A basic evaluation of the outcome is evident. Comments are general and do not relate back to the initial specification. Information is poorly organised, little or no use of technical language/vocabulary. Written communication is limited in terms of organisation of material, with many errors of grammar, punctuation and spelling.
3 - 4	An evaluation of the outcome is evident. Comments offer some detail and relate in part back to the initial specification. Information shows evidence of structure, limited use of technical language/vocabulary. Written communication is limited in terms of organisation of material, with some errors of grammar, punctuation and spelling.
5 - 6	A critical evaluation of the outcome is evident. Comments offer some detail and relate in part back to the initial specification. Information is organised, with basic use of technical language/vocabulary. Written communication is adequate in terms of organisation of material, with some errors of grammar, punctuation and spelling.
7 - 8	A critical evaluation of the outcome is evident. The comments are perceptive and detailed and relate back to the initial specification. Information is well organised, with good use of technical language/vocabulary. Written communication is good, presenting mainly appropriate material in a coherent manner, with few errors of grammar, punctuation and spelling.
9 - 10	A critical evaluation of the outcome is evident. The comments are perceptive and detailed and relate in full back to the initial specification. Information is well organised, presented in a highly appropriate manner, very good use of technical language/vocabulary. Written communication is good, presenting appropriate material in a coherent manner, and largely error-free.

**Suggested improvements (10 marks)**

This is an opportunity for candidates to put forward suggestions for improving the design and/or suggesting any improvement of techniques to ensure better quality of manufacture.

<b>Mark</b>	<b>Attainment</b>
0	No improvements presented. No evidence of written communication.
1 - 2	An improvement to the design and/or manufacturing process has been suggested. Written communication is limited in terms of organisation of material, with many errors of grammar, punctuation and spelling.
3 - 4	Several suggestions for improvements to the design together with a suggestion of how quality of manufacture could be improved. Written communication is limited in terms of organisation of material, with some errors of grammar, punctuation and spelling.
5 - 6	Several relevant suggestions for improvements to the design together with suggestions of how quality of manufacture could be improved. Quality of written communication is basic, some errors of grammar, punctuation and spelling.
7 - 8	Well-founded suggestions for improvements to the design together with suggestions of how quality of manufacture could be improved. Information is well organised, with good use of technical language/vocabulary. Written communication is good, presenting mainly appropriate material in a coherent manner, few errors of grammar, punctuation and spelling.
9 - 10	Well-founded suggestions for improvements to the design together with detailed suggestions of how quality of manufacture could be improved. Information is well organised, with very good use of technical language/vocabulary. Quality of written communication is good, presenting appropriate material in a coherent manner, and largely error-free.

# 6

## GRADE DESCRIPTIONS

Grade descriptions are provided to give a general indication of the standards of achievement likely to have been shown by candidates awarded particular grades. The descriptions must be interpreted in relation to the content specified by the specification; they are not designed to define that content. The grade awarded will depend in practice upon the extent to which the candidate has met the assessment objectives overall. Shortcomings in some aspects of candidates' performance in the assessment may be balanced by better performances in others.

### Grade A

Candidates recall, select and communicate detailed knowledge and thorough understanding of design and technology, including its wider effects.

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.

### Grade C

Candidates recall, select and communicate sound knowledge and understanding of design and technology, including its wider effects.

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.

### Grade F

Candidates recall, select and communicate knowledge and understanding of basic aspects of design and technology, including its wider effects.

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.

# 7

## THE WIDER CURRICULUM

### Key Skills

Key Skills are integral to the study of GCSE Design and Technology and may be assessed through the course content and the related scheme of assessment as defined in the specification. The following key skills can be developed through this specification at levels 1 and 2:

- Communication
- Problem Solving
- Information and Communication Technology
- Working with Others
- Improving Own Learning and Performance
- Application of Number

Mapping of opportunities for the development of these skills against Key Skills evidence requirement is provided in 'Exemplification of Key Skills for Design and Technology', which are available on the WJEC website.

### Opportunities for use of Technology

This specification gives candidates the opportunity to use their ICT skills for practical purposes, especially in the production of their design folios and associated products. These opportunities will apply particularly to the generation of information together with its processing and presentation though, depending on resources and the specific project in question, may include CAD and/or CAM work.

### Spiritual, Moral, Ethical, Social and Cultural Issues

This specification provides opportunities for candidates, through the study of their chosen focus area, to develop an understanding of spiritual, moral, ethical, social and cultural issues as they relate to the designer, manufacturer or user. The specification provides a framework and includes specific content through which individual courses may address these issues

Project work may serve to extend understanding of these issues in order that a balanced appreciation of the conflicts and dilemmas involved in the design and manufacture of products or systems may be encouraged.

Design and Technology also provides opportunities to promote enterprise and entrepreneurial skills through the process of identifying an opportunity to design a product or system to meet a specific need, investigating the work of professional designers, the manufacturing industry, developing their own product or system and finally evaluating the whole process. Tasks linked to the project provide opportunities to develop independent thinking skills, through candidates identifying relevant sources of information and developing specific performance criteria for their designs to guide their thinking.

## Citizenship

In this context citizenship is taken to include the development of social and moral responsibility, participation in community activity and development of political literacy. This specification is designed to make a contribution to the development of the knowledge, skills and understanding of citizenship. In particular, the coursework element will encourage pupils to take an effective part in school-based and community-based activities, showing a willingness and commitment to evaluate such activities critically. Aspects of the project, for example, could be directly related to the needs of the school or local community, which would provide candidates with the opportunity to tackle problems which are real and meaningful to themselves. In doing so, they will be encouraged to demonstrate personal and group responsibility in their attitudes to themselves and others: they would also need to consider critically and constructively the views of others when developing and evaluating possible solutions.

## Environmental Issues

This specification supports all aspects of environmental education. Candidates are expected to develop and appreciate a deeper understanding of the environment. The specification has been developed to consider environmental issues and candidates will be examined on their knowledge and understanding in section A of the written paper.

## Health and Safety Consideration

This part of the specification is about ensuring the safety of everyone working in the school Design and Technology rooms.

Health and safety is vital and centres must take into account all relevant safety legislation and observe all appropriate safety procedures in the working environment.

It is essential for centres to ensure that health and safety and related issues are applied and consideration of these issues must therefore be an integral part of all teaching in Design and Technology.

The specification provides candidates with the opportunity to learn about Health and Safety as it applies to them in the Design and Technology rooms and to become familiar with the processes of ensuring that safe working practices are always employed.

Candidates are should know:

- (a) the safety procedures that apply in the Focus Area that they are studying;
- (b) how to carry out a risk assessment for the tools and equipment they use;
- (c) how to carry out a risk assessment for the machines they use;
- (d) how to carry out a risk assessment for the manufacturing processes they use;
- (e) how to carry out a risk assessment for the materials that they use;
- (f) how to set up, adjust and use tools and equipment safely;
- (g) how to set up, adjust and use machines safely;
- (h) how to carry out manufacturing processes safely;
- (i) how to minimise the risk to themselves and others in the working environment.

## **The European Dimension**

This specification supports environmental education, the European dimension and health education, consistent with EC agreements.

The approach used in constructing the specification lends itself to the establishment of links with other areas of study, particularly those involving problem solving or the use of ICT skills, knowledge and understanding, for example in the completion of tasks and assignments for other GCSE specifications.

The above approach conforms with the aspirations expressed in the 1998 Resolutions of the European Community and the Ministers of Education meeting within the Council, concerning the European dimension in education and environmental education, particularly those intended at the level of member states.