



ASSESSMENT and  
QUALIFICATIONS  
ALLIANCE

# General Certificate of Secondary Education

---

## Design and Technology 3544 Product Design 2009

Material accompanying this Specification

- Specimen Papers and Mark Schemes
- Reports on the Examination
- Teachers' Guide

# SPECIFICATION

This specification will be published annually on the AQA Website ([www.aqa.org.uk](http://www.aqa.org.uk)). If there are any changes to the specification centres will be notified in print as well as on the Website. The version on the Website is the definitive version of the specification.

Further copies of this specification booklet are available from:

AQA Logistics Centre, Unit 2, Wheel Forge Way, Ashburton Park, Trafford Park, Manchester, M17 1EH.

Telephone: 0870 410 1036 Fax: 0161 953 1177

or

can be downloaded from the AQA Website: [www.aqa.org.uk](http://www.aqa.org.uk)

Copyright © 2007 AQA and its licensors. All rights reserved.

#### COPYRIGHT

AQA retains the copyright on all its publications. However, registered centres for AQA are permitted to copy material from this booklet for their own internal use, with the following important exception: AQA cannot give permission to centres to photocopy any material that is acknowledged to a third party even for internal use within the centre.

Set and published by the Assessment and Qualifications Alliance.

# Contents

## Background Information

- |   |  |   |
|---|--|---|
| 1 | The Revised General Certificate of Secondary Education | 5 |
| 2 | Specification at a Glance                              | 7 |
| 3 | Availability of Assessment Units and Entry Details     | 8 |

## Scheme of Assessment

- |   |                       |    |
|---|-----------------------|----|
| 4 | Introduction          | 9  |
| 5 | Aims                  | 10 |
| 6 | Assessment Objectives | 10 |
| 7 | Scheme of Assessment  | 11 |

## Subject Content

- |   |                             |    |
|---|-----------------------------|----|
| 8 | Summary of Subject Content  | 13 |
| 9 | Designing and Making Skills | 13 |

## Key Skills and Other Issues

- |    |   |    |
|----|---|----|
| 10 | Key Skills – Teaching, Developing and Providing Opportunities for Generating Evidence | 25 |
| 11 | Spiritual, Moral, Ethical, Social, Cultural and Other Issues                          | 31 |

## Centre-Assessed Component

12	Nature of the Centre-Assessed Component	32
13	Guidance on Setting the Centre-Assessed Component	33
14	Assessment Criteria	36
15	Supervision and Authentication	41
16	Standardisation	42
17	Administrative Procedures	43
18	Moderation	44

## Awarding and Reporting

19	Grading, Shelf-Life and Re-Sits	45
----	---------------------------------	----

## Appendices

A	Grade Descriptions	46
B	Record Forms	48
C	Overlaps with Other Qualifications	49
D	Project Assessment Matrix	50

# Background Information

## 1

# The Revised General Certificate of Secondary Education

Following a review of the National Curriculum requirements, and the establishment of the National Qualifications Framework, all the unitary awarding bodies have revised their GCSE syllabuses for examination in 2003 onwards.

### 1.1 Changes at GCSE

#### Key Skills

All GCSE specifications must identify, as appropriate, opportunities for generating evidence on which candidates may be assessed in the “main” Key Skills of communication, application of number and information technology at the appropriate level(s). Also, where appropriate, they must identify opportunities for developing and generating evidence for addressing the “wider” Key Skills of working with others, improving own learning and performance and problem solving. Design and Technology is uniquely placed to provide opportunities for all six Key Skills.

#### Spiritual, moral, ethical, social, cultural, environmental, health and safety and European Issues

All specifications must identify ways in which the study of the subject can contribute to an awareness and understanding of these issues.

#### ICT

The National Curriculum requires that students should be given opportunities to apply and develop their ICT capacity through the use of ICT tools to support their learning. In each specification candidates will be required to make effective use of ICT in ways appropriate to the needs of the subject.

#### Tiering

In most subjects the scheme of assessment must include question papers, targeted at two tiers of grades, ie A\* - D and C - G.

A safety net of an allowed Grade E will be provided for candidates entered for the higher tier who just fail to achieve Grade D. The questions will still be targeted at A\* - D.

#### Citizenship

From 2002, students in England will be required to study Citizenship as a National Curriculum subject. Each GCSE specification must signpost, where appropriate, opportunities for developing citizenship knowledge, skills and understanding.

**1.2 Changes to the Design and Technology Criteria**

The main changes to the Design and Technology criteria are given below.

- a. The Aims have been simplified to reflect the National Curriculum requirements, but it should be noted that they now include a consideration of the influences of past and present design and technology on society.
- b. The Assessment Objectives have been expanded.
  - AO1 consists of materials, components, processes, techniques and industrial practices.
  - AO2 combines designing and making into one objective.
  - AO3 evaluation of processes and products includes examining the wider effects of design and technology on society.
- c. Greater emphasis has been placed on ICT, particularly CAD/CAM.

2

# Specification at a Glance

## *Design and Technology*

### *(Product Design)*

This specification is one of a suite of seven in Design and Technology offered by AQA. There are two tiers of assessment: Foundation (G-C) and Higher (D-A\*).

GCSE 3544	
Written Paper	40% of total marks
Foundation Tier	2 hours
Higher Tier	2 hours
<p>The paper will test all Assessment Objectives through a range of broad and general questions on product design. Some questions will allow candidates to display specific material knowledge, understanding and skills.</p> <p>All questions are compulsory.</p>	
Coursework Project	60% of total marks not to exceed 40 hours
<p>Coursework will be internally assessed and externally moderated.</p> <p>Coursework consists of a project which addresses all the assessment objectives in an integrated way. The evidence required for the project consists of a 3-dimensional product and a concise design folder and/or the appropriate ICT evidence.</p>	

  

Foundation Tier	←
3544F	
Higher Tier	
3544H	

## 3

# Availability of Assessment Units and Entry Details

3.1	Availability of Assessment Units	Examinations based on this Specification are available in the June examination series only.
3.2	Entry Codes	<p>Normal entry requirements apply, but the following information should be noted.</p> <p>The <b>Subject Code</b> for entry to the GCSE award is 3544.</p>
3.3	Classification Codes	<p>Each specification is assigned to a national classification code, indicating the subject area to which it belongs.</p> <p>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.</p> <p>The classification code for this specification is 9080.</p>
3.4	Private Candidates	This specification is not available for private candidates.
3.5	Access Arrangements and Special Consideration	<p>AQA pays due regard to the provisions of the Disability Discrimination Act 1995 in its administration of this specification.</p> <p>Arrangements may be made to enable candidates with disabilities or other difficulties to access the assessment. An example of an access arrangement is the production of a Braille paper for a candidate with a visual impairment. Special consideration may be requested for candidates whose work has been affected by illness or other exceptional circumstances.</p> <p>Further details can be found in the Joint Council for Qualifications (JCQ) document: <i>Access Arrangements and Special Consideration Regulations and Guidance Relating to Candidates who are Eligible for Adjustments in Examination</i> <i>GCE, VCE, GCSE, GNVQ, Entry Level &amp; Key Skills</i></p> <p>This document can be viewed via the AQA web site (<a href="http://www.aqa.org.uk">www.aqa.org.uk</a>)</p> <p>Applications for access arrangements and special consideration should be submitted to AQA by the Examinations Officer at the centre.</p>
3.6	Language of Examinations	All assessments will be through the medium of English. Assessment materials will not be provided in Welsh or Gaelic.



# Scheme of Assessment

## 4

## Introduction

### 4.1 National Criteria

This GCSE Design and Technology (Product Design) specification complies with the following:

- The GCSE Subject Criteria for Design and Technology;
- The GCSE, GCE, GNVQ and AEA Code of Practice April 2007.
- The GCSE Qualification Specific Criteria;
- The Arrangements for the Statutory Regulation of External Qualifications in England, Wales and Northern Ireland: Common Criteria.
- The National Curriculum Order for Design and Technology.

### 4.2 Rationale

This specification will allow candidates to specialise in the focus area of product design where they will learn about a range of materials, manufacturing processes, techniques and technologies and be able to use them as appropriate to the design and make process.

### 4.3 Prior level of attainment and recommended prior learning

The specification builds on the Key Stage 3 programme of study for Design and Technology. It is expected that candidates will have followed this programme before commencing work on this specification.

It will be beneficial for candidates to have achieved at least Level 1 in the Key Skills of *Application of Number*, *Communication* and *Information Technology* to cope with the demands of this specification.

### 4.4 Progression

This qualification is a recognised part of the National Qualifications framework. As such, GCSE provides progression from Key Stage 3 through Key Stage 4 to post-16 studies. It lays an appropriate foundation for further study of Design and Technology.

## 5

## Aims

A course based on this specification should encourage candidates to

- a. demonstrate fully their design and technology capability, which requires them to combine skills with knowledge and understanding in order to design and make quality products in quantity;
- b. acquire and apply knowledge, skills and understanding through:
  - analysing and evaluating products and processes;
  - engaging in focused tasks to develop and demonstrate techniques;
  - engaging in strategies for developing ideas, planning and producing products;
  - considering how past and present design and technology, relevant to a designing and making context, affects society;
  - recognising the moral, cultural and environmental issues inherent in design and technology.

## 6

## Assessment Objectives

### 6.1 Assessment Objectives

Candidates should be able to demonstrate their design and technology capability through acquiring and applying knowledge, skills and understanding:

- a. of materials, components, processes, techniques and industrial practice;
- b. when designing and making quality products in quantity;
- c. when evaluating processes and products and examining the wider effects of design and technology on society.

### 6.2 Quality of Written Communication

Where candidates are required to produce extended written material in English, they will be assessed on the quality of written communication. Candidates will be required to:

- present relevant information in a form that suits its purposes;
- ensure that text is legible and that spelling, punctuation and grammar are accurate, so that meaning is clear.

Quality of written communication will be assessed in candidates' coursework design folders.

## 7

# Scheme of Assessment

## 7.1 Assessment Units

The Scheme of Assessment comprises two components.

### Written Paper

40% of the marks

Foundation Tier	2 hours	125 marks
Higher Tier	2 hours	125 marks

All questions are compulsory.

Questions will test the application of knowledge and understanding of materials, components, processes, techniques, technologies and the evaluation of commercial practices and products. Questions will largely address general aspects of product design which cross all material areas, although some questions will allow subject specific knowledge to be shown.

### Coursework Project

40 hours

60% of the marks

95 marks

The coursework project will be internally assessed and externally moderated. Full details on coursework are given in Sections 12-18 below.

The project should address all three assessment objectives in an integrated way. Candidates are required to submit a 3-dimensional product or outcome and a concise design folder and/or the appropriate ICT evidence. Candidates have the freedom in product design to use the type and variety of materials necessary to satisfy their design brief.

Throughout the project candidates should address the industrial and commercial practices, and the moral, social, cultural and environmental issues, arising from their work.

Experience has shown that candidates are often highly motivated where they devise their own project outlines. This is, therefore, to be encouraged and guidelines for the preparation of outlines are given in para 13.1. Examples of suitable project outlines are given in 13.2 which can also provide starting points for candidates.

Centres should ensure that candidates embark on projects that can satisfy the coursework requirements and be completed in 40 hours.

The assessment criteria in Section 14 should be used as a guide for teachers and candidates to the type of work and the standards required.

## 7.2 Weighting of Assessment Objectives

The approximate relationship between the relative percentage weighting of the Assessment Objectives (AOs) and the overall Scheme of Assessment is shown in the following table:

Assessment Objectives	Component Weightings (%)		Overall Weighting of AOs (%)
	Coursework	Written Paper	
1 Materials and Components	10	10	20
2 Designing and Making	40	20	60
3 Evaluation and Social Issues	10	10	20
<b>Overall Weighting of Units (%)</b>	<b>60</b>	<b>40</b>	<b>100</b>

# Subject Content

## 8

### Summary of Subject Content

Section 9 specifies the general designing and making skills required for this course and the knowledge and understanding candidates should acquire. Section 9 consists of the following four broad areas of study:

Designing and Making Skills;  
Materials and Components;  
Design and Market Influences;  
Processes and Manufacture.

## 9

### Designing and Making Skills

Design and Technology is a practical subject area which requires the application of knowledge and understanding when developing ideas, planning, producing products and evaluating them. The distinction between Designing and Making is a convenient one to make, but in practice the two often merge. For example, research can involve not only investigating printed matter and people's opinions, but also investigating e.g. proportions, adhesives, colour, structures, circuits and materials through practical work.

The skills which follow underpin all learning and cover the programme of study for Key Stage 4 Design and Technology.

#### 9.1 Designing Skills

##### **Candidates should be taught:**

to understand the basic design principles of line, form and colour and their application in designing;

to develop and use design briefs, detailed specifications and criteria in relation to product development;

to consider the conflicting demands that moral, cultural, economic, environmental, historical and social issues can make in the planning and in the designing of products;

to consider their own health and safety and that of makers, manufacturers, individual users and society at large;

to consider an increasing range of users of products and different societies in relation to their differing needs and values;

to anticipate and design for product maintenance;

to design for manufacturing in quantity;

to plan for quality control and quality assurance when designing products and to be aware of the difference;

to generate design proposals against stated design criteria, and to modify their proposals in the light of on-going analysis, evaluation and product development;

to use graphic techniques and ICT, including CAD to generate, develop, model and communicate design proposals;

to match materials and components with tools, equipment and processes, taking account of critical dimensions and tolerances when deciding how to manufacture the product;

to produce and use detailed working schedules that will achieve the desired objectives in the time available, setting realistic deadlines for the various stages of manufacture, identifying critical points in the making process and providing alternatives to possible problems;

to devise and apply test procedures to check the quality of their work at critical points during development, and to indicate ways of modifying and improving it when necessary;

to be flexible and adaptable in their designing, in order to respond to problems, changing circumstances and new opportunities;

to ensure that the quality of their design solution will be suitable for intended clients and consumers;

to understand the difference between quality of design and quality of manufacture and use essential criteria to evaluate the quality of products they have made and products which have been made commercially;

---

## 9.2 Making Skills

### Candidates should be taught:

to match materials and components with tools, equipment and processes to produce quality products;

to use tools and equipment safely, accurately and efficiently to achieve an appropriate fit, finish and reliable functioning in products that match their specifications;

to use a range of industrial applications when working with familiar materials and processes;

to manufacture products singly and in quantity, including the practical application of quality control and quality assurance techniques;

to use computer-aided manufacture (CAM) in single item production and in batch or volume production;

to simulate production and assembly lines including the use of ICT;

to be adaptable in their working practices, in order to respond to changing circumstances and new opportunities;

to ensure, through testing, modification and evaluation, that the quality of their products is suitable for intended users and devise modifications where necessary that would improve performance.

## *Materials and Components*

Candidates should build upon the National Curriculum Key Stage 3 Programmes of Study to develop a working knowledge of a wide range of materials appropriate to modelling, prototyping and manufacturing. Candidates should be aware of the processes and techniques which aid manufacture and of the commercial and industrial applications of a range of materials involved in manufacturing their products in quantity. It is expected that designing and making will address complete product issues and therefore deal with materials which would aid manufacture, such as moulds, cutting dies, printing blocks, jigs etc. as well as dealing with issues such as labelling, packaging etc. It will be important therefore that candidates can utilise a variety of suitable materials and components.

Whilst undertaking product analysis activities, it is expected that candidates will make detailed references to the materials used as well as the associated manufacturing issues.

---

### 9.3 Classification and working properties of materials

The following materials and components are considered to be suitable for candidates following this course of study. Candidates are not required to study all materials, but centres must provide opportunities for candidates to learn about a **range** of materials and to use them in practical contexts, during both the development and manufacture of products and during product analysis. **As a minimum, candidates should study Paper/Card and one other material area.**

Candidates may employ/use any necessary materials in the modelling, prototyping or manufacture of their products.

Candidates will be required to demonstrate their application of knowledge, understanding and skills in both assessment units.

Health and Safety factors should be a major consideration when working with any of the materials.

Paper/card

**When working with paper/card materials candidates should:**

be able to identify common papers such as layout, cartridge, tracing, grid, card, corrugated, foam core board;

understand the different properties and uses of such materials both as a media for communication and as a material for manufacturing products such as packaging;

understand that many paper based boards are composites and that the composition can be adjusted to create different properties for specific purposes e.g. foil-backed for food packaging;

understand the stock forms for such materials i.e. size, thickness, weight and colour;

have a basic understanding of the source of pulp and the primary processes involved in conversion to workable materials.

Timber based materials

**When working with timber based materials candidates should:**

be able to identify common timbers such as pine, mahogany, teak, ash, beech used in the production of toys, furniture and household goods;

be able to identify common manufactured boards i.e. MDF, plywood, chipboard, blockboard, hardboard;

understand the different properties and uses of such materials within the consumer markets of toys, furniture and household goods;

understand that many timber-based materials are composites therefore the composition can be adjusted to create different properties for specific purposes;

understand the stock forms for such materials i.e. rough sawn, PSE, sheet sizes and mouldings;

have a basic understanding of the source of timber and the primary processes involved in conversion to workable materials.

Ferrous and non ferrous metals

**When working with metals candidates should:**

be able to identify common metals i.e. mild steel, brass, copper, aluminium, pewter;

understand the different properties and uses of such materials within engineering and domestic products;

understand that many metals are alloys therefore the composition can be adjusted to create different properties for specific purposes e.g. casting alloys;



understand that the properties of metal can be changed by heat treatment;

have an understanding of the stock forms for such materials i.e. sheet, rod, bar, tube;

have a basic understanding of the source of metals and the primary processes involved in conversion to workable materials.

## Plastics

### **When working with plastic materials candidates should:**

be able to identify common thermoplastics i.e. rigid polystyrene, acrylic, acetate, HDPE, PVC;

be able to identify common thermosetting plastics i.e. GRP, Epoxy resin, UF, MF;

understand the difference between thermoplastics and thermosetting plastics;

understand the ways in which plastics can be formed, especially with regard to consumer products, i.e. vacuum forming, injection moulding, blow moulding, line bending;

understand that most plastics are synthetic and that the composition can be adjusted to create different properties for specific purposes e.g. increase rigidity, reduce weight, insulation;

understand the stock forms for such materials i.e. sheet, rod, powder, granules, foam;

have a basic understanding of the source of plastics and the primary processes involved in conversion to workable materials.

## Ceramics

### **When working with ceramic materials candidates should:**

be able to identify common clays and related materials such as St Thomas', porcelain, plaster of Paris;

understand that firing methods and temperatures affect both the clay structure and the effect of applied glazes;

understand the different properties and uses of such materials particularly with regard to domestic pottery and the electrical industry;

understand that most ceramic products are composites of clay and glaze and that the composition can be adjusted to create different properties for specific purposes

understand the stock forms for such materials i.e. slip, body, pigments, oxides;

have a basic understanding of the source of ceramic materials and the primary processes involved in conversion to workable materials.

## Textiles

### **When working with textile materials candidates should:**

be able to identify common natural and synthetic fibres such as cotton, wool, silk, polyester, nylon;

understand the difference between woven, knitted and bonded fabrics and the different properties and uses of such fabrics;

understand the stock forms for yarns and fabrics i.e. fabric roll size, weight, ply;

understand the availability of common components e.g. threads, buttons, zips, fastenings;

understand that many textile fabrics are composites and that the composition can be adjusted to create different properties for specific purposes;

have a basic understanding of the source of textile fibres and the primary processes involved in conversion to workable materials.

## Food

### **When working with food materials candidates should:**

be able to classify food materials as starch, sugar, protein, fats, fibre, vitamins, minerals;

understand the working characteristics of food materials;

understand the way food components are specified i.e. by weight and volume;

understand that food components are available in a variety of forms i.e. fresh, frozen, dehydrated, liquid, canned;

have a basic understanding of the source of basic foods and the primary processes involved in conversion to workable materials.

Control components

**When working with control components candidates should:**

be able to identify common electronic and mechanical components and understand their functions and uses;

understand the way in which such components are specified;

**9.4 Manipulating and Combining Materials**

**Candidates should learn:**

how materials can be combined and processed in order to create more useful, or desirable, properties;

how these properties are utilised in industrial contexts;

how a range of materials are prepared for manufacture, allowing for waste and fine finishing;

about a variety of self-finishing and applied-finishing processes, and appreciate their importance for aesthetic and functional reasons;

that to achieve the optimum use of materials and components, account needs to be taken of the complex inter-relationships between materials, form and manufacturing processes;

how pre-manufactured standard components are used to improve the effectiveness of the manufacturing process.

## *Design and Market Influences*

Candidates should develop an understanding of the broad perspectives of the designed world. This will include the appreciation of line, shape, form, proportion, colour, movement and texture within a critical awareness of aesthetics and ergonomics.

**9.5 Evolution of Product Design**  
Major developments in design and technology

**Candidates should:**

recognise that products evolve over time because of developments in ideas, materials, manufacturing processes and technologies as well as because of social changes;

recognise that design movements and cultural influences are still influencing new product development;

be aware that manufacturing industries are involved in *continuous improvement* (CI) and this is a major influence in product evolution;

be aware that sometimes new products are developed because of marketing pull and sometimes because of technological push;

The study of natural forms	recognise the impact of natural form, pattern and structure as a major influence for designing and making both historically and culturally;  be able to use nature as a starting point for designing and making;
The study of manufactured products	recognise the impact of the work of well known artists, designers, craftsmen and technologists as a major influence for innovation in designing and making both historically and culturally;  engage in detailed product analysis as a means of developing ideas for new products or for improvements to existing products;
The use of mathematics	recognise the impact of mathematical pattern and structure as a major influence for designing and making both historically and culturally;  be able to use mathematics as a starting point for designing and making.

---

## 9.6 Design in Practice

### Candidates should:

identify situations where there is a need to produce a design solution to a problem;

discuss and analyse the situation/problem;

gather research, evaluate and select information and data to support the design and manufacture of products;

consider the factors involved in the design of a product which is to be produced/manufactured in quantity;

consider a wide range of users and produce designs which are inclusive rather than exclusive;

determine the degree of accuracy required for the product to function as planned, taking account of critical dimensions and tolerances in determining methods of manufacture;

understand how graphic techniques, ICT equipment and software, particularly CAD, can be used in a variety of ways to model aspects of design proposals and assist in making decisions;

be aware that design ideas are protected in law through copyright, patents and registered designs;

### Communication and representation of ideas

use a range of graphical techniques such as annotated sketches, formal drawing conventions, CAD to communicate detail in a clear and appropriate manner;

develop a range of presentation techniques and media to portray materials, texture or finish such as mood boards, presentation drawings, digital photography;

Design Methodology	<p>use line, tone, colour rendering using a range of media; use formal page layout techniques as an aid to planning and presenting drawings and information;</p> <p>use a range of prototyping and modelling methods in order to explore design alternatives during the design process as well as a means of communicating proposals which can be used for evaluation purposes;</p> <p>use a range of ICT equipment and software to communicate, model and present ideas;</p> <p>understand that designing is not a linear exercise but is iterative. The traditional design cycle is just one of many methods for successful designing;</p> <p>understand that empirical problem solving, a systems approach and intuitive designing are all valid approaches to designing;</p> <p>experience a variety of design approaches.</p>
--------------------	--

---

**9.7 Design in the Human Context**

**Candidates should understand that:**

Human needs and wants	social, economic and ethnic groups of people often have specific values and needs which can be an aid to focused designing.
Human factors	<p>that for products to be effective, designers, manufacturers and craftsmen need to take account of anthropometrics and ergonomic considerations in an attempt to produce inclusive rather than exclusive designs;</p> <p>that efficient manufacturing systems result from the layout of materials and equipment such as working triangles in the kitchen, production lines;</p>
Safety	<p>the relevance of safety with regard to themselves, the manufacturer and the product user;</p> <p>that designers and manufacturers have both a moral and legal responsibility for the artefacts that they produce.</p>
Quality	<p><b>Candidates should:</b></p> <p>ensure that their products are of a suitable quality for their intended user;</p> <p>understand that many judgements regarding quality are subjective and will be dependent upon factors such as cost, availability of resources and other social factors;</p> <p>investigate ways which are used commercially to improve quality assurance such as quality circles, team-working, BS EN ISO 9000;</p>

### The Environment

take into consideration the complete life cycle and the impact on the environment of a wide range of products, both their own and existing commercial designs;

be aware of the main factors governing environmentally friendly products, or “Green Designs” and be able to identify a range of these;

be aware of the main factors relating to recycling materials or products i.e. material identification, material separation, collection, processing, energy costs, subsequent usage, wastage;

take account of these issues in their own designing;

### Consumer protection

be aware of the work of consumer groups and pressure groups and the way products are evaluated – e.g. *Which?* reports;

be aware of the work of standards agencies (BSI, ISO etc) and how these standards affect product design and manufacture and subsequent testing;

be aware that a wide range of legislation exists to protect consumers and that designers and manufacturers need to conform to it;

## Processes and Manufacture

Candidates are expected to be able to manufacture products using a range of materials and processes. They should have a broad understanding of manufacturing systems for the production of commercial products both in the industrial and the developing world.

---

### 9.8 Product Manufacture

#### Candidates should learn:

how a range of materials are cut, shaped and formed to designated tolerances;

the difference between quality control and quality assurance techniques;

to produce detailed working schedules that will achieve the desired objectives, setting realistic deadlines for the various stages of manufacture, identifying critical points in the making process and providing alternatives to possible problems;

to evaluate the quality of their personal project work and to devise modifications that will improve their products.

**9.9 Industrial and Commercial Practice**

**Scales of production**

**Candidates should:**

understand that products are manufactured to different scales of production i.e. one-offs, batch, mass, continuous;

design and make for one-off, batch and mass production;

work as part of a team on the batch production of a product;

understand how computer-aided manufacture (CAM) is used both in manufacturing in quantity and in the production of single items and small batches.

**Manufacturing systems**

understand that commercial manufacturing is a system, or group of sub-systems which requires:

- special buildings or places of work;
- the organisation of people;
- the organisation of tools and equipment;
- the organisation of materials;
- information systems to help people communicate with each other reliably;
- ways of changing the shape and form of materials to increase their usefulness;
- ways of using tools and equipment to transform the materials into products;
- the design and production of many products in a systematic way;
- quality assurance procedures and quality checks to be made;
- efficient working methods;
- ways of safely taking care of the unwanted outputs of manufacturing i.e. disposing or recycling of waste materials, and ways of looking after the environment.

**Equipment and materials processing**

**Candidates should:**

use a range of procedures including CAD/CAM to ensure consistency in the production of their products;

use both hand and machine methods of cutting and shaping materials.

## 9.10 Systems and Control

### Candidates should learn:

to devise and apply test procedures to check the quality of their work at critical points during development, and to indicate ways of improving it;

how control systems and sub-systems can be designed, used and connected to achieve different purposes;

how feedback is incorporated into systems;

how to analyse the performance of systems;

how microprocessors are increasingly used in control systems;

how CAM allows for higher levels of accuracy and repeatability;

how communication systems are increasingly being used for applications such as video conferencing, software sharing, data transfer, remote manufacturing and how these are changing working practices.



## Key Skills and Other Issues

10

### Key Skills – Teaching, Developing and Providing Opportunities for Generating Evidence

#### 10.1 Introduction

The Key Skills Qualification requires candidates to demonstrate levels of achievement in the Key Skills of *Application of Number, Communication and Information Technology*.

The units for the ‘wider’ Key Skills of *Improving own Learning and Performance, Working with Others* and *Problem-Solving* are also available. The acquisition and demonstration of ability in these ‘wider’ Key Skills is deemed highly desirable for all candidates, but they do not form part of the Key Skills Qualification. Design and Technology, however, does offer a unique opportunity for candidates to provide evidence for all six Key Skills.

Copies of the Key Skills Units may be downloaded from the QCA Website (<http://www.qca.org.uk/keyskills>).

The units for each Key Skill comprise three sections:

- A What you need to know.
- B What you must do.
- C Guidance.

Candidates following a course of study based on this Specification for Design and Technology (Product Design) can be offered opportunities to develop and generate evidence of attainment in aspects of the Key Skills of *Communication, Application of Number, Information Technology, Improving own Learning and Performance, Working with Others* and *Problem-Solving*. Areas of study and learning that can be used to encourage the acquisition and use of Key Skills, and to provide opportunities to generate evidence for Part B of the units, are signposted below.

#### 10.2 Key Skills Opportunities in Design and Technology (Product Design)

The broad and multi-disciplinary nature of Design and Technology makes it an ideal vehicle to help candidates develop their knowledge and understanding of all Key Skills and to produce evidence of their application. It should be noted that, while *Working with Others* is an important aspect of Design and Technology, the work candidates submit for coursework assessment must be their own.

### Application of Number Level 1

What you must do ...	Signposting of Opportunities for Generating Evidence in Subject Content
<b>N1.1</b> Interpret information from different sources	9.3, 9.5, 9.6, 9.7
<b>N1.2</b> Carry out calculations	9.4, 9.5
<b>N1.3</b> Interpret results and present findings	9.5

### Application of Number Level 2

What you must do ...	Signposting of Opportunities for Generating Evidence in Subject Content
<b>N2.1</b> Interpret information from different sources	9.3, 9.6, 9.7
<b>N2.2</b> Carry out calculations	9.4, 9.5
<b>N2.3</b> Interpret results and present findings	9.5

### Communication Level 1

What you must do ...	Signposting of Opportunities for Generating Evidence in Subject Content
<b>C1.1</b> Take part in discussions	9.1, 9.6
<b>C1.2</b> Read and obtain information	9.1, 9.3, 9.5
<b>C1.3</b> Write different types of documents	9.1, 9.6

**Communication Level 2**

<b>What you must do ...</b>	<b>Signposting of Opportunities for Generating Evidence in Subject Content</b>
<b>C2.1a</b> Contribute to discussions	9.1, 9.6
<b>C2.1b</b> Give a short talk	9.6
<b>C2.2</b> Read and summarise information	9.1, 9.3, 9.5
<b>C2.3</b> Write different types of documents	9.1, 9.6

**Information Technology Level 1**

<b>What you must do ...</b>	<b>Signposting of Opportunities for Generating Evidence in Subject Content</b>
<b>IT1.1</b> Find, explore and develop information	9.3, 9.8, 9.10
<b>IT1.2</b> Present information, including text, numbers and images	9.1, 9.6

**Information Technology Level 2**

<b>What you must do ...</b>	<b>Signposting of Opportunities for Generating Evidence in Subject Content</b>
<b>IT2.1</b> Search for and select information	9.3, 9.10
<b>IT2.2</b> Explore and develop information and derive new information	9.6, 9.8
<b>IT2.3</b> Present combined information, including text, numbers and images	9.1, 9.6, 9.10

### Working with Others Level 1

What you must do ...	Signposting of Opportunities for Generating Evidence in Subject Content
<b>WO1.1</b> Confirm what needs to be done and who is to do it	9.1, 9.9
<b>WO1.2</b> Work towards agreed objectives	9.1, 9.9
<b>WO1.3</b> Identify progress and suggest improvements	9.1, 9.9

### Working with Others Level 2

What you must do ...	Signposting of Opportunities for Generating Evidence in Subject Content
<b>WO2.1</b> Plan work and confirm working arrangements	9.1, 9.9
<b>WO2.2</b> Work cooperatively achieving identified objectives	9.1, 9.9
<b>WO2.3</b> Exchange information on progress and agree ways of improving work with others	9.1, 9.9

### Improving own Learning and Performance Level 1

What you must do ...	Signposting of Opportunities for Generating Evidence in Subject Content
<b>LP1.1</b> Confirm short-term targets and plan how they will be met	9.1, 9.6, 9.8
<b>LP1.2</b> Follow plan to meet targets and to improve performance	9.1, 9.6, 9.8
<b>LP1.3</b> Review progress and achievement	9.1, 9.6, 9.8

**Improving Own Learning and Performance Level 2**

<b>What you must do ...</b>	<b>Signposting of Opportunities for Generating Evidence in Subject Content</b>
<b>LP2.1</b> Help set short-term targets and plan how these will be met	9.1, 9.6, 9.8
<b>LP2.2</b> Use plan and support from others, to meet targets	9.1, 9.6, 9.8
<b>LP2.3</b> Review progress and identify evidence of achievements	9.1, 9.2, 9.6, 9.8

**Problem Solving Level 1**

<b>What you must do ...</b>	<b>Signposting of Opportunities for Generating Evidence in Subject Content</b>
<b>PS1.1</b> Confirm understanding of given problems	9.1, 9.6
<b>PS1.2</b> Plan and try out ways of solving problems	9.1, 9.6
<b>PS1.3</b> Check if problems have been solved and describe the results	9.1, 9.2, 9.6

**Problem Solving Level 2**

<b>What you must do ...</b>	<b>Signposting of Opportunities for Generating Evidence in Subject Content</b>
<b>PS2.1</b> Identify problems and come up with ways of solving them	9.1, 9.6
<b>PS2.2</b> Plan and try out options	9.1, 9.6
<b>PS2.3</b> Apply given methods to check if problems have been solved and describe the results	9.1, 9.2, 9.6

### 10.3 Further Guidance

More specific guidance and examples of tasks that can provide evidence of single Key Skills, or composite tasks that can provide evidence of more than one Key Skill are given in the AQA specification support material, particularly the Teachers' Guide.

## 11

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

- |   |   |
|---|---|
| 11.1 Spiritual, Moral, Ethical, Social, Cultural and Other Issues | The study of design and technology should contribute substantially to candidates' understanding of moral, ethical, social and cultural issues. Such issues underlie all design and manufacturing activities and are explicitly referred to in paragraphs 9.1 to 9.10 of the Subject Content. These issues will be tested in both coursework and the written paper.  |
| 11.2 European Dimension   | AQA has taken account of the 1988 Resolution of the Council of the European Community in preparing this specification and associated specimen papers.   |
| 11.3 Environmental Issues   | AQA has taken account of the 1988 Resolution of the Council of the European Community and the Report " <i>Environmental Responsibility: An Agenda for Further and Higher Education</i> " 1993 in preparing this specification and associated specimen papers.<br><br>Environmental considerations are important to the development of all designs and products. Awareness of these issues is specifically required in all sections of the Subject Content and will be tested in both components. See Section 13 for details of coursework requirements.   |
| 11.4 Citizenship  | In the Key Stage 4 programme of study for Citizenship, <i>Developing skills of enquiry and communication</i> (Section 2) and <i>Developing skills of participation and responsible action</i> (Section 3) naturally parallel candidates' actions and approaches during project work. For example, the effects of certain products or manufacturing systems on society and the individual are matters of interest in design and technology, but they also touch on Section 2(a) of the Citizenship programme of study. Similarly, the designer needs to empathise with the end user (Section 3(a)) and in the process of designing needs to negotiate with clients or during market research to determine and achieve the desired ends (Section 3(b)). |
| 11.5 Avoidance of Bias  | AQA has taken great care in the preparation of this specification and associated specimen papers to avoid bias of any kind.   |
| 11.6 Health and Safety  | Health and safety impinges on all aspects of Design and Technology and requires consideration in terms of the maker, the manufacturer, the individual user and society at large. Health and safety and related issues should therefore be an integral part of all teaching. They are expected to be considered in coursework and will also be tested in the written paper.  |

## Centre-Assessed Component

### 12

## Nature of the Centre-Assessed Component

### 12.1 The nature of Design and Technology

The distinguishing feature of any Design and Technology course is its practical nature. Knowledge and understanding is not therefore to be acquired purely for its own sake, but in order to satisfy the needs of clients and consumers, and the constraints placed on manufacturers in industrial and commercial contexts.

For Product Design, candidates will need to be familiar with a range of material areas and the use of CAD/CAM in production.

Underpinning all learning are the designing, communication and making skills which make use of Knowledge and Understanding in order to produce outcomes which satisfy a design brief.

#### Designing

Designing is a process based activity involving the progressive engagement with a problem which requires thinking, creating, inventing, predicting, experimenting, decision making, constant evaluation and, where necessary, modification. Designers develop an awareness of the opportunities and constraints placed upon them by taking account of the demands of users and producers, market forces and the effects their products can have on society and the environment.

The activities detailed above draw upon relevant skills and knowledge which are enriched by the application of human values.

#### Making

The realisation of design ideas and solutions to problems is achieved by making products where a range of materials and media may be used. In design and technology, making activities may take many forms, ranging through early experimentation, testing and trials to a final marketable product. All the aspects detailed above provide opportunities for students to develop making skills as they seek to produce high quality outcomes.

#### Communication

Communication is an integral aspect of the whole process and it plays three major roles in any design and technology activity.

First, it enables the designer to visualise ideas and thoughts which permit detailed analysis. Second, it provides a record which can be referred to, adapted or refined as the process progresses. Third, it provides an explanation for others of the development of ideas from the mind to the outcome.



The range of communication methods is wide and becoming wider through the increasing use of ICT. All or any should be used *as appropriate to the task in hand* – notes, sketches, formal drawings, photographs, computer programs, oral communication and two or three dimensional representations are all relevant in particular circumstances.

## 12.2 The Coursework Project

Candidates are required to submit a single integrated project which consists of a *concise* design folder and/or appropriate ICT evidence and a 3-dimensional outcome. The whole activity should not exceed 40 hours.

There are no barriers to the type or variety of materials candidates can use. In a broad ranging specification such as this, it is expected that *appropriate* materials will be used to satisfy the design brief.

GCSE Design and Technology involves increased emphasis on the industrial aspects of designing and making, particularly in the use of CAD/CAM, and on the wider effects of technological activity on society and the environment. These elements should therefore be evident in candidates' projects.

Candidates wishing to work with others may do so. Centres must ensure, however, that candidates select appropriate projects and provide individual and separate evidence of their own ability to design and make a quality product from start to finish.

Candidates may use the Board-set project outlines given in paragraph 13.2 below, formulate their own briefs or use briefs set by the centre. The centre is responsible for ensuring candidates attempt projects which satisfy the coursework requirements (see Section 14 below).

Candidates may enter for any other GCSE specification at the same sitting. However the submission of the same piece of coursework for more than one specification is prohibited.

# 13

## Guidance on Setting the Centre-Assessed Component

### 13.1 Project Outlines

Examples of project outlines are given in paragraph 13.2 for Design and Technology (Product Design). Centres may use these or adapt them to meet the needs of their candidates. Centres wishing to develop their own outlines for candidates should take note of the following guidelines.

The checklist below is given to help teachers ensure that the project outlines they prepare will meet both the needs of candidates and the requirements of the specification. Prior approval of centre devised project outlines is not required.

- a. Does the outline encourage an integrated approach to designing and making and represent a *level of demand* appropriate to the individual candidate's ability?
- b. Has the outline or problem been so written that candidates will be able to demonstrate the highest level of their ability in each Assessment Objective?
- c. Where a single outline, e.g. design and make an educational toy, is to be presented to a number of candidates covering a wide ability range, has each candidate produced a brief for him/herself that will be challenging, but not daunting?
- d.
  - Does the project outline offer scope for candidates to consider:
  - the effects and implications of technological activity (e.g. industrial, social, moral, cultural, economic, environmental factors);
  - systems and control;
  - provision for product maintenance;
  - repetition skills (e.g. multiple production);
  - use of CAD/CAM and ICT skills in general;
  - product quality;
  - health and safety in relation to the maker and others?
- e. Are the resources, equipment, tools, materials and media available for the potential demands of the project?
- f. Can the project be completed satisfactorily in 40 hours?
- g. Will the task permit sufficient supervision to enable the teacher to certify that the candidate's work is his/her own?

Where candidates work with others, it must be possible to identify the individual contribution of each candidate, so that the requirements in the specification are met.

- h. Is the project outline free from political, ethnic, gender and other forms of bias?

---

### 13.2 Project Outlines

The following list of possible projects is provided as a starting point for candidates. Candidates may use these, adapt them or devise their own.

- Technological advances have led to an increased amount of leisure time. Design, make, package and market a game to encourage social interaction amongst a particular group of individuals.
- Body adornment exists in all cultures to various different degrees. Design, make and market a trend setting idea.
- A new perfume or aftershave product is to be launched. It needs an image, container, package, and point of sale display and product launch.
- Healthy living includes a combination of diet and exercise. Devise a strategy to encourage teenagers (or any chosen group) to follow a healthy lifestyle
- A new magazine is to be launched. Choose the subject and design the cover to include a 'freebie' to encourage sales.
- Environmental issues are becoming ever more important. Choose an issue and devise a strategy to raise public awareness.
- Design, make, market and package a product to mark a particular celebration. (Eid, Easter, Ramadan, Yom Kippur etc).
- The tourist office (local, or of a country or region you know well) is launching a campaign to encourage visitors to the area. What products could you design, make and market to be sold to tourists.
- Travel by air, train, coach or even car brings new problems or challenges for the designer, e.g. storage of items in restricted space, keeping valuables safe or keeping young children amused. Can you design and produce a solution to one of these problems or is there another associated problem you want to solve?
- Keeping up with current news is very important in some situations. Cricket enthusiasts can often be seen at matches clutching a radio to their ear listening to the commentary. Can you design and produce a Radio that can be easily worn?

---

### 13.3 Support Material

Further examples of project outlines are included in the *Teachers' Guide*. Other material to support teachers will be produced for the annual teachers' meetings in the Autumn Term.

---

### 13.4 Coursework Advisers

Coursework Advisers will be available to assist centres with any matters relating to coursework. Details will be provided when AQA knows which centres are following the specification.

## Assessment Criteria

### 14.1 Introduction

Teachers are required to determine grades separately for the designing and making elements of their candidates' coursework. To do this they must use their professional judgement in conjunction with the Assessment Criteria given in 14.3 below.

The level of demand of a design brief should influence the interpretation of the criteria. A successful project which makes great demands on skills, cognitive abilities and breadth and depth of knowledge should be more highly rewarded than a successful project with fewer demanding aspects.

Quality of work is more important than quantity or size. For this reason no estimate of the number of pages in a design folio or of the size and complexity of the product is given. Candidates should, however, plan to produce **concise** design folders and/or appropriate ICT evidence and 3D outcomes which can reasonably be completed, in total, in no more than 40 hours. Candidates who do not complete their projects will be assessed on what they submit.

Candidates wishing to work with others may do so. Centres must ensure, however, that candidates select appropriate projects and provide individual and separate evidence of their own ability to design and make a quality product from start to finish.

The Assessment Criteria give guidance on the expected levels of achievement in Designing Skills and Making Skills for grades G-A. A\* does not feature as a coursework grade because A\* grades are determined arithmetically for Higher Tier candidates on the total marks gained for the examination.

As in any holistic assessment, a weak performance in one aspect of a candidate's work may be balanced by a strong performance in another. The principle of "best fit" should be applied when using these criteria.

An assessment of the quality of written communication in the design folder is to be made according to the criteria given in 14.4.

Centres are strongly recommended to provide candidates with feedback as their work progresses. This can not only encourage or reward the candidates, but it can also ease the assessment burden on teachers at the end of the coursework period.

Teachers should not record their comment on candidates' work; any written comments should be recorded on the Candidate Record Form.

### 14.2 Assessment Procedure

An assessment of a candidate's coursework should follow the pattern given below.

- a. Guided by the criteria, assess the Designing Skills in terms of a whole grade, e.g. Grade C.

- b. Refine that decision to High (H), Middle (M) or Low (L). A candidate only just achieving the required standard should be given the lowest assessment in the grade, (L), while a candidate just failing to reach the grade above should be given the highest in the grade (H).
- c. Repeat a. and b. above for Making Skills.
- d. Record the refined grade for Designing (e.g. High B = HB) and the refined grade for Making (e.g. Mid E = ME) on page 4 of the Candidate Record Form.
- e. Using the *Project Assessment Matrix* (Appendix E), derive from the two grade decisions a single mark. For example, a High B for Designing and a Mid E for Making will produce a mark of 52.
- f. Record the mark derived from the matrix in the space on page 4.
- g. Using the criteria below, make an overall assessment of candidates' completed design folders for the quality of written communication (QWC) and determine a mark out of a maximum of 5 marks.
- h. Record the QWC mark in the space provided on page 4.
- i. Add together the Matrix mark and the QWC mark and write the total out of 95 in the Total Mark box.
- j. The total mark for each candidate is to be recorded on the AQA mark sheet which will be sent to centres in the Spring Term.

14.3 Assessment Criteria Candidates will have:

Grade	Designing	Making
<b>G</b>	<ol style="list-style-type: none"> <li>gathered minimal research information;</li> <li>provided little evidence of analysis of task or research;</li> <li>produced a simple specification;</li> <li>produced a solution, with rudimentary forward planning;</li> <li>attempted a superficial evaluation of the outcome of their work;</li> <li>demonstrated very limited communication, graphical and ICT skills;</li> <li>provided little or no evidence of having considered industrial practices and systems and control.</li> </ol>	<ol style="list-style-type: none"> <li>used materials, components and equipment safely under close supervision;</li> <li>produced references to the use of CAM where appropriate;</li> <li>produced an undemanding or incomplete outcome;</li> <li>some evidence of QA and QC.</li> </ol>
<b>F</b>	<ol style="list-style-type: none"> <li>used more than one source to gather research information;</li> <li>made a limited attempt to analyse the task and the research material;</li> <li>produced a generalised specification;</li> <li>produced at least two proposals which satisfy parts of the specification;</li> <li>used a proposal to produce the outcome with little development and forward planning;</li> <li>superficially tested and evaluated their work against original intentions;</li> <li>demonstrated limited communication, graphical and ICT skills;</li> <li>provided limited evidence of having considered industrial practices and systems and control.</li> </ol>	<ol style="list-style-type: none"> <li>used materials, components and equipment correctly and safely (including CAM if appropriate);</li> <li>produced a largely complete but undemanding outcome;</li> <li>demonstrated accuracy and finish in some parts of the product;</li> <li>produced evidence of some QA and QC.</li> </ol>
<b>E</b>	<ol style="list-style-type: none"> <li>used a limited number of sources to gather research information;</li> <li>made a superficial analysis of the task and most of the research material;</li> <li>produced a specification which reflects the most obvious features of the analysis;</li> <li>produced some proposals which satisfy most of the specification;</li> <li>used their proposals and relevant knowledge to produce a solution which satisfies most of the specification;</li> <li>demonstrated some forward planning;</li> <li>tested and evaluated some aspects of their work;</li> <li>used some appropriate communication, graphical and ICT skills to convey design ideas;</li> <li>provided limited evidence of having considered industrial practices and systems and control.</li> </ol>	<ol style="list-style-type: none"> <li>corrected working errors where necessary;</li> <li>used materials, components, equipment and processes correctly and safely (including CAM if appropriate);</li> <li>produced a largely complete and largely effective outcome;</li> <li>demonstrated a fair degree of accuracy and finish in the overall product;</li> <li>applied QA and QC broadly but superficially.</li> </ol>
<b>D</b>	<ol style="list-style-type: none"> <li>used several appropriate sources to gather relevant research information;</li> <li>made a simple analysis of the task and all research material;</li> <li>produced a specification which reflects most of the analysis;</li> <li>produced several proposals which satisfy the specification;</li> <li>used their proposals and relevant knowledge to develop a solution which satisfies the specification;</li> <li>planned sequence of making activities;</li> <li>tested and evaluated most aspects of their work and made some appropriate modifications;</li> <li>used appropriate communication, graphical and ICT skills to convey design ideas;</li> <li>provided limited evidence of having considered relevant industrial practices and systems and control.</li> </ol>	<ol style="list-style-type: none"> <li>appropriately corrected working errors;</li> <li>used appropriate materials, components, equipment and processes correctly and safely (including CAM);</li> <li>produced an effective and largely complete outcome;</li> <li>demonstrated a reasonable level of accuracy and finish in the product;</li> <li>applied QA and QC broadly.</li> </ol>

**Candidates will have:**

Grade	Designing	Making
<b>C</b>	<ol style="list-style-type: none"> <li>used a variety of appropriate sources to gather and order relevant research information;</li> <li>analysed the task and the research material;</li> <li>produced a specification which reflects the analysis;</li> <li>produced a range of proposals which satisfy the specification;</li> <li>used their proposals and relevant knowledge to develop a detailed design solution which satisfies the specification;</li> <li>planned a largely correct, and workable, sequence of main making activities;</li> <li>tested, evaluated and modified their work throughout the process as appropriate;</li> <li>used a range of communication, graphical and ICT skills sufficient to convey ideas to themselves and others;</li> <li>provided evidence of having considered relevant issues, industrial practices and systems and control.</li> </ol>	<ol style="list-style-type: none"> <li>recognised the need for and justified any changes or adaptations;</li> <li>used appropriate materials, components, tools, equipment and processes (including CAM) correctly and safely;</li> <li>produced a complete, effective and well-assembled outcome;</li> <li>demonstrated a level of accuracy and finish in the product which satisfies most of the demands of the design solution;</li> <li>clearly used QA and QC to control quality in most activities.</li> </ol>
<b>B</b>	<ol style="list-style-type: none"> <li>produced a well ordered and relevant range of appropriate research information;</li> <li>thoroughly analysed the task and research material;</li> <li>produced a detailed specification closely reflecting the analysis;</li> <li>produced a wide range of proposals which satisfy the specification;</li> <li>used their proposals and relevant knowledge of techniques, manufacturing and working characteristics of materials to develop a detailed design solution;</li> <li>planned the correct sequence of making activities;</li> <li>tested, evaluated and modified their work throughout the process as appropriate;</li> <li>used an appropriate range of communication, graphical and ICT skills sufficient to convey ideas to themselves and others effectively;</li> <li>provided evidence of having considered relevant issues, industrial practices and systems and control.</li> </ol>	<ol style="list-style-type: none"> <li>recorded and justified the need for any changes or adaptations;</li> <li>used appropriate materials, components, tools, equipment and processes (including CAM) skilfully, correctly and safely;</li> <li>made a complete, effective and skilfully-produced outcome;</li> <li>demonstrated a level of accuracy and finish in the product which satisfies the demands of the design solution;</li> <li>provided evidence of QA &amp; QC throughout manufacture.</li> </ol>
<b>A</b>	<ol style="list-style-type: none"> <li>used a wide variety of appropriate sources to gather relevant research information;</li> <li>analysed the task and the research material logically, thoroughly and effectively;</li> <li>produced a detailed specification which focuses closely on the analysis;</li> <li>produced a wide range of distinct proposals which satisfy the specification;</li> <li>used one or more of their proposals and relevant knowledge of techniques, manufacturing and working characteristics to develop a detailed and coherent design solution;</li> <li>produced a correct sequence of activities which shows where, why and how practical production decisions were made;</li> <li>tested, objectively evaluated and effectively modified their work throughout the process as appropriate;</li> <li>selected and skilfully used a wide range of communication, graphical and ICT skills which have helped to clarify their thinking and are sufficient to convey ideas to themselves and others effectively and precisely;</li> <li>provided evidence that they have considered and taken account of relevant issues, industrial practices and systems and control.</li> </ol>	<ol style="list-style-type: none"> <li>recorded and justified the need for any changes or adaptations;</li> <li>used appropriate materials, components, equipment and processes (including CAM) consistently correctly, skilfully and safely;</li> <li>made a complete product of high quality;</li> <li>demonstrated an ability to satisfy accurately and completely all the demands of the design solution;</li> <li>thoroughly considered QA &amp; QC and applied them consistently and successfully.</li> </ol>

**14.4 Quality of Written Communication**

An assessment for the quality of written communication shown in the completed design folder is to be made separately from the designing grade. Use the criteria given below and record the mark on the Candidate Record Form.

**Marks**

- 4-5 Information is clearly and logically presented using an appropriate form. The text is legible. Candidates spell, punctuate and use the rules of grammar accurately, enabling the meaning to be clearly understood.
- 2-3 Information is presented in an appropriate form. The text is legible. Candidates generally spell, punctuate and use the rules of grammar accurately, although there may be some errors. The meaning is clear.
- 1 Some of the information presented is in an appropriate form. Generally the text is legible. Although there are errors in spelling, punctuation and grammar, candidates' meaning can be understood.
- 0 Candidates have failed to reach the standard required for the award of a mark.

---

**14.5 Evidence to Support the Award of Marks**

A *Candidate Record Form* will be provided for each candidate to help teachers to keep records of their assessments during the course, in a form which facilitates the complete and accurate submission of the final assessments at the end of the course.

When the assessments are complete, the grades and/or marks awarded under each of the assessment criteria must be entered on the Candidate Record Form, with supporting information given in the spaces provided.



## 15

## Supervision and Authentication

- 
- 15.1 Supervision of Candidates' Work** Candidates' work for assessment must be undertaken under conditions which allow the teacher to supervise the work and enable the work to be authenticated. If it is necessary for some assessed work to be done outside the centre, sufficient work must take place under direct supervision to allow the teacher to authenticate each candidate's whole work with confidence.
- 
- 15.2 Guidance by the Teacher** The work assessed must be solely that of the candidate concerned.
- The Coursework Project is, however, as much a vehicle for teaching as for assessment. It is therefore expected that the teacher will need to give advice and assistance to individual candidates as part of normal teaching. This should be provided, but normally in such a way that candidates have alternative possibilities to explore, and their own decisions to make about accepting or using the information or advice provided by the teacher. There may, of course, be occasions when direct teacher intervention is necessary to ensure safety, to prevent costly waste of materials or to provide a less able candidate with positive assistance.
- In any case where assistance given to an individual candidate goes beyond normal teaching, details must be recorded on the Candidate Record Form and taken into account in the assessment of coursework.
- 
- 15.3 Unfair Practice** At the start of the course, the supervising teacher is responsible for informing candidates of the AQA Regulations concerning malpractice. Candidates must not take part in any unfair practice in the preparation of coursework to be submitted for assessment, and must understand that to present material copied directly from books or other sources without acknowledgement will be regarded as deliberate deception. Centres must report suspected malpractice to AQA. The penalties for malpractice are set out in the AQA Regulations.
- 
- 15.4 Authentication of Candidates' Work** Both the candidate and the teacher are required to sign declarations confirming that the work submitted for assessment is the candidate's own. The teacher declares that the work was conducted under the specified conditions, and records details of any additional assistance.

## Standardisation

---

### 16.1 Standardising Meetings

Annual standardising meetings will usually be held in the autumn term. Centres entering candidates for the first time must send a representative to the meetings. Attendance is also mandatory in the following cases:

- where there has been a serious misinterpretation of the specification requirements;
- where the nature of coursework tasks set by a centre has been inappropriate;
- where a significant adjustment has been made to a centre's marks in the previous year's examination.

After the first year, attendance is at the discretion of centres. At these meetings support will be provided for centres in the development of appropriate coursework tasks and assessment procedures.

---

### 16.2 Internal Standardisation of Marking

The centre is required to standardise the assessments across different teachers and teaching groups to ensure that all candidates at the centre have been judged against the same standards. If two or more teachers are involved in marking a component, one teacher must be designated as responsible for internal standardisation. Common pieces of work must be marked on a trial basis and differences between assessments discussed at a training session in which all teachers involved must participate. The teacher responsible for standardising the marking must ensure that the training includes the use of reference and archive materials such as work from a previous year or examples provided by AQA. The centre is required to send to the moderator the Centre Declaration Sheet, duly signed, to confirm that the marking of centre-assessed work at the centre has been standardised. If only one teacher has undertaken the marking, that person must sign this form.

## Administrative Procedures

### 17.1 Recording Assessments

The candidates' work must be marked according to the assessment criteria set out in sections 14.3 and 14.4. The marks and supporting information must be recorded in accordance with the instructions in Section 14.5. The completed Candidate Record Form for each candidate must be attached to the work and made available to AQA on request.

At the beginning of the course, centres are required to inform the AQA of the approximate number of candidates to be entered for the examination so that the appropriate number of Candidate Record Forms may be sent.

### 17.2 Submitting Marks and Sample Work for Moderation

The total component mark for each candidate must be submitted to AQA on the mark sheets provided or by Electronic Data Interchange (EDI) by the specified date. Centres will be informed which candidates' work is required in the samples to be submitted to the moderator.

### 17.3 Factors Affecting Individual Candidates

Teachers should be able to accommodate the occasional absence of candidates by ensuring that the opportunity is given for them to make up missed assessments.

Special consideration should be requested for candidates whose work has been affected by illness or other exceptional circumstances. Information about the procedure is issued separately.

If work is lost, AQA should be notified immediately of the date of the loss, how it occurred, and who was responsible for the loss. AQA will advise on the procedures to be followed in such cases.

Where special help which goes beyond normal learning support is given, AQA must be informed so that such help can be taken into account when assessment and moderation take place.

Candidates who move from one centre to another during the course sometimes present a problem for a scheme of internal assessment. Possible courses of action depend on the stage at which the move takes place. If the move occurs early in the course the new centre should take responsibility for assessment. If it occurs late in the course it may be possible to accept the assessments made at the previous centre. Centres should contact AQA at the earliest possible stage for advice about appropriate arrangements in individual cases.

#### 17.4 Retaining Evidence and Re-Using Marks

The centre must retain the work of all candidates, with Candidate Record Form attached, under secure conditions, from the time it is assessed, to allow for the possibility of an enquiry upon results. The work may be returned to candidates after the issue of results provided that no enquiry upon result is to be made which will include re-moderation of the coursework component. If an enquiry upon result is to be made, the work must remain under secure conditions until requested by AQA.

Candidates re-taking the examination may carry forward their moderated coursework marks. These marks have a shelf-life which is limited only by the shelf-life of the specification, and they may be carried forward an unlimited number of times within this shelf-life.

---

## 18

## Moderation

---

#### 18.1 Moderation Procedures

Moderation of the coursework is by inspection of a sample of candidates' work. This will initially involve design folders for the sample being sent by post from the centre to the moderator appointed by AQA. Moderators will visit new centres to assess the practical outcomes. They will also visit other centres as needs dictate. The centre marks must be submitted to AQA and the sample of design folders must reach the moderator by the specified date in the year in which the qualification is awarded.

Following the re-marking of the sample work, the moderator's marks are compared with the centre marks to determine whether any adjustment is needed in order to bring the centre's assessments into line with standards generally. In some cases it may be necessary for the moderator to call for the work of other candidates. In order to meet this possible request, centres must have available the coursework and Candidate Record Form of every candidate entered for the examination and be prepared to submit it on demand. Mark adjustments will normally preserve the centre's order of merit, but where major discrepancies are found, AQA reserves the right to alter the order of merit.

---

#### 18.2 Post-Moderation Procedures

On publication of the GCSE results, the centre is supplied with details of the final marks for the coursework component.

The candidates' work is returned to the centre after the examination with a report form from the moderator giving feedback to the centre on the appropriateness of the tasks set, the accuracy of the assessments made, and the reasons for any adjustments to the marks.

Some candidates' work may be retained by AQA for archive purposes.

# Awarding and Reporting

## 19

## Grading, Shelf-Life and Re-Sits

19.1	Qualification Title	<p>The qualification based on this specification has the following title:</p> <p>AQA General Certificate of Secondary Education in Design and Technology (Product Design).</p>
19.2	Grading System	<p>The qualification will be graded on an 8 point grade Scale A*, A, B, C, D, E, F, G. Candidates who fail to reach the minimum standard for grade G will be recorded as U (unclassified) and will not receive a qualification certificate.</p> <p>Candidates must be entered for either the Foundation Tier or Higher Tier. For candidates entered for the Foundation Tier, grades C–G are available. For candidates entered for the Higher Tier A*–D are available. There is a safety net for candidates entered for the Higher Tier, where an allowed Grade E will be awarded where candidates just fail to achieve Grade D. Candidates who fail to achieve a Grade E on the Higher Tier or Grade G on the Foundation Tier will be reported as unclassified.</p>
19.3	Re-Sits	<p>Individual components may not be retaken, but candidates may retake the whole qualification more than once.</p>
19.4	Minimum Requirements	<p>Candidates will be graded on the basis of work submitted for assessment.</p>
19.5	Carrying Forward of Centre-Assessed Marks	<p>Candidates re-taking the examination may carry forward their moderated coursework marks. These marks have a shelf-life which is limited only by the shelf-life of the specification, and they may be carried forward an unlimited number of times within this shelf-life.</p>
19.6	Awarding and Reporting	<p>The regulatory authorities, in consultation with GCSE awarding bodies, developed a revised Code of Practice for GCSE qualifications which were introduced in September 2000. This specification complies with the grading, awarding and certification requirements of the current GCSE, GCE, GNVQ and AEA Code of Practice April 2007 and will be revised in the light of any subsequent changes for future years.</p>

## Appendices

### A

## Grade Descriptions

The following grade descriptors indicate the level of attainment characteristic of the given grade at GCSE. They give a general indication of the required learning outcomes at each specific grade. The descriptors should be interpreted in relation to the content outlined in 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 (as in section 6) overall. Shortcomings in some aspects of the examination may be balanced by better performances in others.

**Grade F** When designing and making products, and acquiring and applying knowledge, skills and understanding, candidates draw on and use various sources of information. They clarify their ideas through discussion, drawing and modelling; use their understanding of the characteristics of familiar products when developing and communicating their own ideas and work from their own plans, modifying them where appropriate.

Candidates work with a range of tools, materials, equipment, components and processes with some precision; check their work as it develops and modify their approach in the light of progress; test and evaluate their products, showing that they understand the situations in which their designs will have to function and are aware of resources as a constraint and evaluate their use of basic information sources.

**Grade C** When designing and making products, and acquiring and applying knowledge, skills and understanding, candidates use a wide range of appropriate sources of information and strategies to develop ideas, responding to information they have identified. They investigate form, function and production processes and communicate ideas, using appropriate media.

Candidates recognise the needs of users and develop realistic designs. They produce plans that make use of time and resources to carry out the main stages of making products. They work with a range of tools, materials, equipment, components and processes, taking account of their characteristics, and organise their work so that they can carry out processes accurately and consistently, and use tools, equipment, materials and components with precision.

Candidates adapt their methods of manufacture to changing circumstances, providing a sound explanation for any change from the initial specification. They select appropriate techniques to test and evaluate how their products would perform when used and modify their products in the light of ongoing evaluation to improve their performance. They evaluate their use of information sources.

**Grade A** When designing and making products, and acquiring and applying knowledge, skills and understanding, candidates seek out and use information to help their detailed design thinking, and recognise the needs of a variety of client groups. They are discriminating in their selection and use of information sources to support their work and they use a wide range of strategies to develop appropriate ideas, responding to information they have identified.

Candidates investigate form, function and production processes and communicate ideas using a variety of appropriate media. They recognise the different needs of a range of users when developing fully realistic designs. When planning, they make sound decisions on materials and techniques based on their understanding of the physical properties and working characteristics of materials. They work from formal plans that make the best use of time and resources; work with a range of tools, equipment, materials and components to a high degree of precision and make products that are reliable and robust and that fully meet the quality requirements given in the design proposal.

Candidates identify conflicting demands on their design, explain how their ideas address these demands and use this analysis to produce proposals. They identify a broad range of criteria for evaluating and testing their products, clearly relating their findings to the purpose for which the products were designed and the appropriate use of resources, and fully evaluate their use of information sources.

**B**

## Record Forms

**Candidate Record Forms and Centre Declaration Sheets are available on the AQA website in the Administration area. They can be accessed via the following link**  
**[http://www.aqa.org.uk/admin/p\\_course.php](http://www.aqa.org.uk/admin/p_course.php)**



C

## Overlaps with other Qualifications

Some overlaps exist between this and other Design and Technology specifications. The overlap is primarily in the design process and the scheme of assessment. As all specifications conform to the GCSE Design and Technology Subject Criteria, there are also overlaps of broad content, e.g. ICT, health and safety, systems and control, industrial and commercial practice, and for Product Design a likely overlap of materials

D

# Project Assessment Matrix

DESIGN & TECHNOLOGY PROJECT ASSESSMENT MATRIX

DESIGNING SKILLS

	A			B			C			D			E			F			G			U		
	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L
A	90	89	88	86	85	84	82	81	80	78	77	76	74	73	72	70	69	68	66	65	64	62	61	60
M	88	87	86	84	83	82	80	79	78	76	75	74	72	71	70	68	67	66	64	63	62	60	59	58
L	86	85	84	82	81	80	78	77	76	74	73	72	70	69	68	66	65	64	62	61	60	58	57	56
B	82	81	80	78	77	76	74	73	72	70	69	68	66	65	64	62	61	60	58	57	56	54	53	52
M	80	79	78	76	75	74	72	71	70	68	67	66	64	63	62	60	59	58	56	55	54	52	51	50
L	78	77	76	74	73	72	70	69	68	66	65	64	62	61	60	58	57	56	54	53	52	50	49	48
C	74	73	72	70	69	68	66	65	64	62	61	60	58	57	56	54	53	52	50	49	48	46	45	44
M	72	71	70	68	67	66	64	63	62	60	59	58	56	55	54	52	51	50	48	47	46	44	43	42
L	70	69	68	66	65	64	62	61	60	58	57	56	54	53	52	50	49	48	46	45	44	42	41	40
D	66	65	64	62	61	60	58	57	56	54	53	52	50	49	48	46	45	44	42	41	40	38	37	36
M	64	63	62	60	59	58	56	55	54	52	51	50	48	47	46	44	43	42	40	39	38	36	35	34
L	62	61	60	58	57	56	54	53	52	50	49	48	46	45	44	42	41	40	38	37	36	34	33	32
E	58	57	56	54	53	52	50	49	48	46	45	44	42	41	40	38	37	36	34	33	32	30	29	28
M	56	55	54	52	51	50	48	47	46	44	43	42	40	39	38	36	35	34	32	31	30	28	27	26
L	54	53	52	50	49	48	46	45	44	42	41	40	38	37	36	34	33	32	30	29	28	26	25	24
F	50	49	48	46	45	44	42	41	40	38	37	36	34	33	32	30	29	28	26	25	24	22	21	20
M	48	47	46	44	43	42	40	39	38	36	35	34	32	31	30	28	27	26	24	23	22	20	19	18
L	46	45	44	42	41	40	38	37	36	34	33	32	30	29	28	26	25	24	22	21	20	18	17	16
G	42	41	40	38	37	36	34	33	32	30	29	28	26	25	24	22	21	20	18	17	16	14	13	12
M	40	39	38	36	35	34	32	31	30	28	27	26	24	23	22	20	19	18	16	15	14	12	11	10
L	38	37	36	34	33	32	30	29	28	26	25	24	22	21	20	18	17	16	14	13	12	10	9	8
U	34	33	32	30	29	28	26	25	24	22	21	20	18	17	16	14	13	12	10	9	8	6	5	4
M	32	31	30	28	27	26	24	23	22	20	19	18	16	15	14	12	11	10	8	7	6	4	3	2
L	30	29	28	26	25	24	22	21	20	18	17	16	14	13	12	10	9	8	6	5	4	2	1	0

M A K I N G S K I L L S