Oxford Cambridge and RSA Examinations

RECOGNISING ACHIEVEMENT

OCR GCSE IN DESIGN AND TECHNOLOGY (FOOD TECHNOLOGY) 1954

Key Features

- Covers National Curriculum Order for KS4 Design and Technology.
- Coursework clearly linked to teaching content requirement.
- A range of suitable tasks for coursework.
- Immediate support from specialist subject officer.
- Short Course and Certificate of Achievement also available.

Support and In-Service Training for Teachers

- A full programme of In-Service training meetings arranged by the Training and Customer Support Division (telephone 01223 552950).
- Specimen question papers and mark schemes, available from the Publications department (telephone 0870 8706622; fax 0870 8706621).
- Past question papers and mark schemes, available from the Publications department (telephone 0870 8706622; fax 0870 8706621).
- Written advice on coursework proposals.
- A report on the examination, compiled by senior examining personnel after each examination session.
- Individual feedback to each Centre on the moderation of internally assessed work.

CONTENT

Throughout the specification the following icons are used to signpost teaching and learning opportunities in:

Citizenship

ICT

Key Skills

CO	-	Communication
N	-	Application of Number
IT	-	Information Technology
WO	-	Working with Others
LP	-	Improving own Learning and Performance
PS	-	Problem Solving

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SECTION A: SPECIFICATION SUMMARY

Outline

This revised GCSE specification retains the characteristics of the Design and Technology (Food Technology) specification previously offered by OCR.

This revised specification provides a coherent, satisfying and worthwhile course of study for candidates, whether they wish to pursue the study of Design and Technology in the future or whether it will be their last experience of studying the subject.

This specification meets the National Curriculum Order for England (DfEE/QCA 1999) for Design and Technology and the GCSE Subject Criteria (QCA 2000). It provides opportunities for candidates to develop an awareness of the nature and significant importance of Design and Technology in a rapidly changing society. It enables candidates to develop their application of knowledge, skills, and understanding of Food Technology within an overall design and make based approach. The specification offers a system of assessment for GCSE based on clear targets and a coherent set of criteria for rewarding positive achievement across grades G-A*. The assessment of candidates includes both practical capability in Design and Technology applied to designing and making a product, and the knowledge and understanding which underpins this capability.

This specification is fundamentally designed to assess a candidate's capability at the end of KS4. It does, however, recognise that appropriate experiences at KS3 are essential if a candidate is to realise his/her full potential. This specification also provides candidates with a path into AS/A Level Design and Technology, Home Economics and GNVQ Manufacturing and Engineering.

TIERS

Grades	Foundation Tier G to C	Higher Tier D to A*
A*		Candidates take Components 2, 4 and 5
A		
B		
C	Candidates take Components 1, 3 and 5	
D		
E		
F		
G		

COMPONENTS

Component	Name	Duration	Weighting
1	Paper 1 (Foundation)	1 hour	20%
2	Paper 2 (Higher)	1 hour 15 mins	20%
3	Paper 3 (Foundation)	1 hour	20%
4	Paper 4 (Higher)	1 hour 15 mins	20%
5	Internal Assessment (Coursework)	40 hours	60%

QUESTION PAPERS

Papers 1, 2, 3 and 4 will test a candidate's knowledge and understanding of Food Technology through questions on designing and making. There will be no choice of questions.

Papers 1 and 2 will include a product analysis question based on information contained in the question paper. The focus of this product analysis question will **not** follow that of the published theme for papers 3 and 4.

Papers 3 and 4 will include a product analysis question, set on a different theme each year. The theme is printed in the specification with further, detailed information, provided early in the year of the examination.

INTERNAL ASSESSMENT (COURSEWORK)

Internal Assessment (coursework) will consist of a project where candidates will be expected to design and make a quality Food Technology product.

The project can be linked to a candidates own interests, industrial practice or the community.

Projects may involve an enterprise activity, where candidates identify an opportunity, design to meet a need, manufacture products and evaluate the whole design and make process.

Candidates must use appropriate ICT to help with their work. This can include computer-aided design and manufacture (CAD/CAM) software, control programs, data analysis and ICT based sources for research.

Candidates must consider how technology affects society and their own lives.

ENTRY OPTIONS

All candidates should be entered for 1954 with one of the following option codes:

Option Code	Option	Components
F	Foundation Tier	1, 3, 5
H	Higher Tier	2, 4, 5

SECTION B: GENERAL INFORMATION

1 Introduction

1.1 RATIONALE

The specification aims to prepare candidates to participate in tomorrow's rapidly changing technologies.

The specification calls for candidates to become autonomous and creative problem solvers, as individuals and members of a team. They must look for needs, wants and opportunities and respond to them by developing a range of ideas and making products and systems. This specification combines practical skills with an understanding of aesthetics, social and environmental issues, function and industrial practices. Candidates reflect on and evaluate relevant present and past design and technology, its uses and effects.

The specification seeks to help candidates to become discriminating and informed users and innovators of products. It encourages candidates to think and intervene creatively to improve the quality of life for society.

The specification provides a framework, which can be accessed by all candidates with the potential of gaining a GCSE grade G-A*.

OCR has taken great care in the preparation of this specification and assessment material to avoid bias of any kind.

1.2 CERTIFICATION TITLE

This specification will be shown on a certificate as:

OCR GCSE in Design and Technology (Food Technology)

1.3 LEVEL OF QUALIFICATION

GCSE Full Course

This qualification is approved by the regulatory authorities (QCA and ACCAC) as part of the National Qualifications Framework for England and Wales.

Candidates who gain grades G to D will have achieved an award at Foundation Level.

Candidates who gain grades C to A* will have achieved an award at Intermediate Level.

1.4 RECOMMENDED PRIOR LEARNING

Candidates who are taking courses leading to this qualification at Key Stage 4 should normally have followed the corresponding Key Stage 3 programme of study within the National Curriculum.

Candidates entering this course should have achieved a general educational level equivalent to National Curriculum Level 3, or a distinction at Entry Level within the National Qualifications Framework.

1.5 PROGRESSION

GCSE qualifications are general qualifications which enable candidates to progress either directly to employment, or to proceed to further qualifications.

Many candidates who enter employment with one or more GCSEs would undertake training or further part-time study with the support of their employer.

Progression to further study from GCSE will depend upon the number and nature of the grades achieved. Broadly, candidates who are awarded mainly grades G to D at GCSE could either strengthen their base through further study of qualifications at Foundation Level within the National Qualifications Framework or could proceed to Intermediate level. Candidates who are awarded mainly grades C to A* at GCSE would be well prepared for study at Advanced Level within the National Qualifications Framework.

Specifically students who achieve a grade C or above would be well prepared to study AS/A level Design and Technology, Home Economics and GNVQ Manufacturing and Engineering.

1.6 OVERLAP WITH OTHER QUALIFICATIONS

Specifically, two GCSEs at grade G to D or two GCSEs at grade C to A* are equivalent to Part One GNVQ at Foundation and Intermediate Level respectively.

Four GCSEs at grade G to D or four GCSEs at grade C to A* are equivalent to full award GNVQ at Foundation and Intermediate Level respectively.

The format of this specification is shared with other specifications in the Design and Technology suite. The very nature of designing and making means that processes are similar, however, the content that is examined in the papers and internal assessment of the specification is unique.

Of a more general nature this specification provides opportunities to promote knowledge and understanding of a wide range of skills, many of which are shared with other subject areas.

Those identified in the National Curriculum Order for England (DfEE/QCA 1999) for Design and Technology are :

- **thinking skills**, identifying relevant sources of information, and developing criteria for designs to guide their thinking;

- **financial capability**, through taking account of the relative cost of materials and components, in relation to their working characteristics and properties when deciding if, when and how to use them;

- **enterprise and entrepreneurial skills,** through identifying an opportunity to design something to meet a specific need, finding out about the work of professional designers and the manufacturing industry and then making and marketing the prototype product, and evaluating the whole process;

- **work-related learning,** through bringing a realistic industrial or commercial perspective to the development of a product in school based design studios and areas, visiting a workplace for hands-on experience related to designing and making, and providing the opportunity for visitors from business to act as product advisers or clients;

- **education for sustainable development**, through developing knowledge and understanding of the principles of sustainable design and production systems, developing skills in creative problem solving and evaluation, and exploring values and ethics in relation to the application of design and technology.

1.7   RESTRICTIONS ON CANDIDATE ENTRIES

Candidates who enter for this GCSE specification **may not** also enter for any other GCSE specification with the certificate title "Design and Technology (Food Technology)" in the same examination series. Candidates who enter for this GCSE may also enter for any GNVQ specification with the certification title GNVQ Manufacturing, GNVQ Engineering, GNVQ C.B.E. in the same examination series. They may also enter for any NVQ qualification.

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

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.

The classification code for this specification is 9020.

1.8   CODE OF PRACTICE REQUIREMENTS

These specifications will comply in every respect with the revised Code of Practice requirements for courses starting in September 2001.

1.9   STATUS IN WALES AND NORTHERN IRELAND

This specification has been approved by ACCAC for use by Centres in Wales

Candidates in Wales and Northern Ireland should not be disadvantaged by terms, legislation or aspects of government that are different from those in England. Where such situations might occur, including in the external assessment, the terms used have been selected as neutral, so that candidates may apply whatever is appropriate to their own situation.

OCR provides specifications, assessments and supporting documentation only in English.

Further information on the provision of assessment materials in Welsh and Irish may be obtained from the Information Bureau at OCR (telephone 01223 553998).

2 Specification Aims

The specification requires candidates to demonstrate fully their design and technology capability by combining skills with knowledge and understanding, in order to design and make quality products. The specification allows candidates to acquire and apply knowledge, skills and understanding through:

(i)   analysing and evaluating products and processes;
(ii)   engaging in focussed tasks to develop and demonstrate techniques;
(iii)   engaging in strategies for developing ideas, planning and producing products;
(iv)   considering how past and present design and technology, relevant to a designing and making context, affects society;
(v)   recognising the moral, cultural and environmental issues inherent in design and technology.

The aims of this specification are:

• to encourage candidates to combine their designing and making skills with knowledge and understanding, in order to design and make quality products;

• to promote design and technology capability in candidates through activities which involve a range of contexts, materials and processes and to lead to practical outcomes;

• to give opportunities to develop practical abilities and the confidence to design, make and modify products for identified purposes, selecting and using resources effectively;

• to promote the use of graphic techniques and ICT including computer-aided design (CAD), to generate, develop, model and communicate design proposals;

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

• to encourage the development of candidates' critical and aesthetic abilities, enabling them to evaluate design and technology activity, including their own, in the context of an identified need;

• to encourage the development of candidates' understanding of the needs and values of a range of users; including spiritual, moral, social, and cultural considerations;

• to promote the keys skills of communication, application of number, IT, working with others, improving learning and performance and problem solving;

• to encourage the development of candidates' thinking skills, financial capability, enterprise and entrepreneurial skills;

• to encourage the development of candidates' understanding of work-related learning and the principles of sustainable design and production systems;

• to encourage candidates to consider how present and past design and technology, relevant to a designing and making process, affects society;

• to encourage candidates to consider the uses and affects of new technologies and modern materials on product design and manufacture;

• to provide for activities which give candidates opportunities to work both individually and as a member of a team.

Most of these aims are reflected in the assessment objectives, others, due to their very nature, cannot be readily assessed.

3　　Assessment Objectives

The assessment objectives are designed to reflect the programme of study for Design and Technology.

Within this specification candidates will need to demonstrate their ability to:

- develop, plan and communicate ideas;
- work with tools, equipment, materials and components to produce quality products;
- evaluate processes and products;
- understand materials and components;
- understand systems and control.

The GCSE Subject Criteria (QCA 2000) sets out three specification Assessment Objectives for the scheme of assessment :

AO1　　　　Capability through acquiring and applying knowledge, skills and understanding of materials components, processes, techniques and industrial practice;

AO2　　　　Capability through acquiring and applying knowledge, skills and understanding when designing and making quality products;

AO3　　　　Capability through acquiring and applying knowledge, skills and understanding when evaluating processes and products; and examining the wider effects of design and technology on society.

Assessment Components 1-4 Terminal Examination papers

These will test candidates' specialist knowledge, skills and understanding of Food Technology through questions on the subject content (section 5) outlined in the specification.

Assessment Component 5 Internal Assessment (coursework)

Internal Assessment (coursework) will test the knowledge, skills and understanding necessary to design and make products in the appropriate media. The evidence required to be submitted for this task must include a 3 dimensional product with a concise portfolio and/or appropriate ICT evidence.

Internal assessment will be evaluated against the following six internal assessment objectives: (see guidance 7.3.2).

1　　identify a need or opportunity that leads to a design brief;
2　　conduct research into the design brief which results in a specification;
3　　generate possible ideas for a solution;
4　　develop the product for manufacture;
5　　plan and realise the product;
6　　evaluate and test the product.

4 Scheme of Assessment

4.1 TIERS

The scheme of assessment consists of two tiers: Foundation Tier and Higher Tier. Foundation Tier assesses grades G to C and Higher Tier assesses grades D to A*. Candidates must be entered for either the Foundation Tier or the Higher Tier.

Under no circumstances will a candidate entered for the Foundation Tier be awarded a grade higher than grade C. Candidates on the Higher Tier who fail to achieve the minimum mark for the award of a grade D will normally be ungraded. There is however provision for those who narrowly fail to achieve this mark to be awarded a grade E.

Grades	Foundation Tier G to C	Higher Tier D to A*
A*		Candidates take Components 2, 4 and 5
A		
B		
C	Candidates take Components 1, 3 and 5	
D		
E		
F		
G		

4.2 COMPONENTS

Component	Name	Duration	Weighting
1	Paper 1 (Foundation)	1 hour	20%
2	Paper 2 (Higher)	1 hour 15 mins	20%
3	Paper 3 (Foundation)	1 hour	20%
4	Paper 4 (Higher)	1 hour 15 mins	20%
5	Internal Assessment (Coursework)	40 hours	60%

4.3 QUESTION PAPERS

Each question paper will contain five questions reflecting the grades targeted. Responses from candidates will be required in the form of one word, sentences and sketches with supporting notes.

Papers 1 and 2 will include a product analysis question based on information contained in the question paper. The focus of this product analysis question will **not** follow that of the published theme for papers 3 and 4

Papers 3 and 4 will include a product analysis question, set on a different theme each year. Candidates will need to study this theme in order to answer the product analysis question fully. Research material, scrap books etc. cannot be taken into the examination.

The theme for 2003: Electrical Equipment – mixers, blenders and processors. Further detailed information will be provided early in 2003.

4.4 WEIGHTING OF ASSESSMENT OBJECTIVES (AO1/2/3)

The relationship between the components and the specification assessment objectives of the scheme of assessment is shown in the following grid.

Foundation Tier

Component	AO1	AO2	AO3	Total
1	4%	12%	4%	20%
3	4%	12%	4%	20%
5	12%	36%	12%	60%
Overall	20%	60%	20%	100%

Higher Tier

Component	AO1	AO2	AO3	Total
2	4%	12%	4%	20%
4	4%	12%	4%	20%
5	12%	36%	12%	60%
Overall	20%	60%	20%	100%

4.5 ENTRY OPTIONS

All candidates should be entered for 1954 with one of the following option codes:

Option Code	Title	Components
F	Foundation Tier	1, 3, 5
H	Higher Tier	2, 4, 5

4.6   INTERNAL ASSESSMENT (COURSEWORK)

The Internal Assessment will consist of **one** project where candidates will be expected to design and make a quality product. This project requires a design and make activity related to industrial/commercial practices, and the appropriate application of systems and control.

The product can be linked to a candidates own interests, industrial practice or the community. Projects may involve an enterprise activity, where candidates identify an opportunity, design to meet a need, manufacture products and evaluate the whole design and make process.

Candidates must use appropriate ICT to help with their work, including computer-aided design and manufacture (CAD/CAM) software, control programs, data analysis and ICT based sources for research.

Through their project candidates must consider how relevant technology affects society and their own lives.

The evidence required to be submitted for this project must include a 3 dimensional product with a concise portfolio and/or appropriate ICT evidence. The whole activity must not exceed 40 hours of work for the full GCSE course.

If candidates work in groups, each candidate must take responsibility for a uniquely definable aspect of the overall project and undertake unique research, product design, manufacture and evaluation of that project aspect. Each candidate must provide unique evidence for assessment against the six internal assessment objectives with additional evidence in internal assessment objective 6 (evaluation and testing) to indicate the performance of the candidate's design within the context of the performance of the overall project.

Examples of appropriate tasks are given in Section 6.

Full details of the internal assessment objectives for internally assessed work can be found in Section 7.

4.7   ASSESSMENT OF PRESENTATION AND ICT

Overall presentation skills are assessed in the internally assessed component only. Please refer to guidance in section 7.

The assessment of this course requires candidates to use ICT through preparing, presenting, and reviewing information as they work on their design ideas, developing models that communicate these ideas, and making products using computer-aided manufacture (CAM).

4.8   DIFFERENTIATION

Differentiation will be achieved by tiered papers in the terminal examination and by task and outcome in the Internal Assessment. The internal assessment tasks undertaken by each candidate should reflect their capabilities. Exemplar tasks will be available. (see section 6).

4.9   AWARDING OF GRADES

The written papers will have a total weighting of 40% and internal assessment a weighting of 60%.

A candidate's mark for each of the components taken will be combined in the appropriate weighting to give the candidate's total mark for the specification. The candidate's grade will be determined by this total mark.

Candidates achieving less than the minimum mark for grade G will be ungraded.

Candidates on the Higher Tier who fail to achieve the minimum mark for the award of a grade D will normally be ungraded. There is however provision for those who narrowly fail to achieve this mark to be awarded a grade E.

4.10   GRADE DESCRIPTIONS

Grade descriptions are provided to give a general indication of the standards of achievement likely to have been shown by the candidates awarded particular grades. The descriptions must be interpreted in relation to the content specified in Section 5; 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 overall assessment objectives. Shortcomings in some aspects of the assessment may be balanced by better performance in others.

Grade F

When applying their knowledge, skills and understanding to design and make products, candidates:

- draw on and use various sources of information;

- clarify their ideas through discussion, drawing and modelling;

- use their understanding of the characteristics of familiar products when developing and communicating their own ideas;

- work from their own plans, modifying them where appropriate;

- 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;

- evaluate their use of basic information sources.

Grade C

When applying their knowledge, skills and understanding to design and make products, candidates:

- use a wide range of appropriate sources of information to develop ideas;
- use a range of strategies to develop ideas, responding to information they have identified;
- investigate form, function and production processes and communicate ideas, using appropriate media;
- recognise the needs of users and develop realistic designs;
- produce plans that make use of time and resources to carry out the main stages of making products;
- work with a range of tools, materials, equipment, components and processes, taking account of their characteristics;
- organise their work so that they can carry out processes accurately and consistently, and use tools, equipment, materials and components with precision;
- adapt their methods of manufacture to changing circumstances, providing a sound explanation for any change from the initial specification;
- 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;
- evaluate their use of information sources.

Grade A

When applying their knowledge, skills and understanding to design and make products, candidates:

- seek out and use information to help their detailed design thinking, and recognise the needs of a variety of client groups;
- are discriminating in their selection and use of information sources to support their work;
- they use a wide range of strategies to develop appropriate ideas, responding to information they have identified;
- investigate form, function and production processes and communicate ideas using a variety of appropriate media;
- 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;
- 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;
- make products that are reliable and robust and that fully meet the quality requirements given in the design proposal;
- identify conflicting demands on their design, explain how their ideas address these demands and use this analysis to produce proposals;

- 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;

- fully evaluate their use of information sources.

SECTION C: SPECIFICATION CONTENT

5   Introduction

During the key stage, candidates should be taught the knowledge, skills and understanding through: (N.C. order reference paragraph number)

- product analysis   (6a)
- focused practical tasks that develop a range of techniques, skills, processes and knowledge (6b)
- design and make assignments, which include activities related to industrial practices and the application of systems and control. (6c)

This section is set out in column format to help teachers relate the requirements of the specification content with experiences that would be applicable.

Design and Technology, by its very nature, is continually developing. Teachers should be aware of new developments when preparing candidates for this examination.

The subject content in this section will be tested in the terminal examination. In addition candidates must address this content in their project work.

All the subject content in this section applies to the GCSE (Full Course). The content written in *italics* will only be tested in Examination Papers 3 and 4.

5.1 DESIGNING AND MAKING

5.1.1 Developing and Writing a Design Brief (1a)

C1.2, C2.2, WO1.1, WO1.2, WO2.1, LP2.1, PS2.1

Candidates should be able to:

(N.C. order reference paragraph number)

Range of activities:

(a) provide a detailed description of the design need using various means of communication;

text, drawings, photographs, *graphs, media clippings,* word processing*, scanning*

(b) extract from verbal, visual and statistical information the essential problems to be solved;

consideration of information, food trends, consumer preference, dietary needs, media influence

(c) identify the range of users and the market for which the product is intended;

(1b)

questionnaires, *use of the internet,* surveys, influences of trends, potential market possibilities

(d) develop a design brief for a marketable product.

a clear statement of design intention linked to either the candidates own interests, home, industrial practice or the community

5.1.2 Drawing up a Specification

IT1.1, WO1.1, WO1.2, WO2.1, LP1.1, PS1.1

Candidates should be able to:	Range of activities:
(a) examine the intended purpose of the product;	observation, consideration of existing products past and present e.g. spider diagram (star chart)
(b) identify and collect data relevant to the product(s) and its users; (1b)	nutritional value, cost, suitability for different groups of people, packaging, HACCP, labelling, commercial methods of production, British and European standards e.g. ISO, BS,'e' mark
(c) consider issues that affect planning;	appropriate environmental *and monetary* costs
(d) identify and evaluate how existing products fulfil the needs of their intended users;	market and product analysis, *market surveys*, in relationship *to moral, social, economic,* environmental *and cultural* factors, use of CD ROMS, *spreadsheets, digital cameras*
(e) demonstrate an ability to express the results of research and analysis in the form of a suitable detailed specification;	a written specification, word processing
(f) consider the capability required to manufacture in quantity. (1c)	consideration of possible systems that would control production

5.1.3 Generating Design Proposals

WO1.1, WO1.2, WO2.1, LP2.2, PS1.2, PS2.1, PS2.2

Candidates should be able to:	**Range of activities:**
(a) generate and record a range of design proposals suitable for manufacturing in quantity; (1c)	ideas recorded in a combination of text and graphic techniques produce a plan of action that shows: planning; making; evaluating design ideas; show references to necessary changes to plan of action
(b) identify within those proposals the resources needed for the solution to be realised; (1e)	reference to recipes, existing products, tools, equipment and materials needed
(c) evaluate their ideas against the specification and modify where necessary;	annotated comments about ideas
(d) consider whether ideas meet the original need; (3a)	compare generated ideas with the design specification criteria
(e) understand the relevance of function and aesthetics;	ergonomic, sensory and functional consideration of design ideas i.e. taste, texture, appearance
(f) identify, with reasons for selection/rejection, the chosen design proposal(s) for product development;	evidence to support choice and reasons for rejection
(g) use graphic techniques and ICT, including computer-aided design (CAD), to generate, develop, model and communicate design proposals. (1g)	graphic techniques and computer aided design (CAD) used to generate, *develop, model* and communicate design proposals; use word processing, *Internet, CD ROM for modelling.* Nutritional *modelling,* spreadsheets, d*igital camera*

5.1.4 Product Development

IT2.2, WO1.1, WO1.2, WO2.1, LP1.2, PS2.2

Candidates should be able to:	Range of activities:
(a) conduct testing or trialling to make decisions on materials, production processess and selection of pre-manufactured standard components;	the chosen idea refined, tested and improved. A list of materials is made and the order of work is clearly stated, including tools and equipment required.
(b) match materials and components with tools, equipment and processes when deciding how to manufacture the product in quantity; (1e)	develop a detailed final product specification
(c) simulate production by developing a system to control the manufacture of a product individually and/or in batch quality; (2e)	suggested method of production, include information about the use of additives and components HACCP
(d) be flexible and adaptable in responding to changing circumstances and new opportunities; (1f)	adjusting and modifying parts of the design if required throughout trialling and testing
(e) use graphic techniques and ICT, including computer-aided design (CAD), to generate, develop, model and communicate design proposals. (1g)	graphic techniques and computer aided design (CAD) used to generate, *develop, model* and communicate design proposals; use word processing, *Internet, CD ROM for modelling.* Nutritional *modelling,* spreadsheets, *digital camera*

5.1.5 Product Planning

WO2.2, LP1.1, LP2.1, PS2.2

Candidates should be able to:	Range of activities:
(a) produce and use a detailed plan of work including: • manufactured items; • materials; • equipment; • tools and processes; • consideration of health and safety issues against a realistic time schedule; (1d) (3b)	a proposed work plan which sets realistic deadlines *and identifies critical points and controls.* Flowcharts, d*igital camera*
(b) prepare materials economically allowing for waste and fine finish and use pre-manufactured standard components appropriately.	efficient material preparation e.g. marking, measuring, weighing

5.1.6 Tools and Equipment

Candidates should be able to use a range of tools, equipment and processes effectively and safely, including: (2a)	**Range of activities:**
(a) measure/weigh basic ingredients; (4a)	work in Metric units and be able to convert from Imperial units
(b) mix ingredients in the appropriate way;	hand methods, hand held mixer/blender food processors/mixers/blenders
(c) cut ingredients in an appropriate way;	hand methods, pastry cutter
(d) shape and form foodstuffs;	hand methods, cutters, moulds, burger press
(e) apply correct heating/cooling processes;	ovens, hobs, microwaves, freezers, refrigerators
(f) apply a range of graphic media as appropriate to marketing, presentation and packaging of food products.	a range of pencils, crayons, computer images, text and photographs, *digital camera, scanner*

5.1.7 Processes

C1.2, N1.2

Candidates should be able to:	**Range of activities**
(4b)	
(a) apply a range of processing techniques to produce food products;	• to assemble the food products • heat tranference through appropriate methods of cooking. Boiling, baking, grilling, microwaving, *steaming, frying, roasting*
(b) understand methods used to increase shelf life;	freezing, chilling, *pickling, jamming,* heat, *UHT, canning, chemical irradiation, dehydration,* vacuum packaging
(c) show an awareness of processes and equipment as used in an industrial context;	control systems, industrial processes and equipment
(d) apply finishing techniques.	decoration, glazing

5.1.8 ICT Applications

IT1.1, IT2.1, IT2.2, IT2.3

Candidates should:	**Range of activities:**
(a) understand how CAD/CAM is used in industrial manufacturing;	books, videos etc, *industrial visits*
(b) recognise that computer systems can control machines and equipment;	robotics used in production lines e.g. for placing lids on pies
(c) understand how CAD/CAM is used in the manufacture of single items and small batches. (2d)	modern computer controlled production methods ensuring quality control, design packaging, temperature control, weighing

Candidates should use ICT where appropriate to:

(d) desk top publish;	combine written information and graphics, *produce a questionnaire.*
(e) produce bar charts, pie charts etc from data;	present results in a graphical form
(f) produce graphics;	use a paint or draw program to produce original art work including line, texture, colour
(g) mould and size text, and/or graphics to suit requirements;	produce text in appropriate styles and sizes for presentation and advertising/packaging
(h) aid Design and Technology activities;	use ICT appropriately to handle, model or communicate design proposals: (i) research from a database, use the internet; nutritional programs, recipe databases; (ii) present data in the form of tables, charts or graphics; *(iii) use a spreadsheet for costing/modelling;* *(iv) use e-mail to distribute questionnaires;* *(v) use data logging to measure time, temperature, ph levels;* *(vi) use software to investigate a range of hazards (HACCP).*
(i) utilise CAD. (1g)	create and manipulate a range of 2D/3D images, producing accurate drawings use scanners and digital cameras

5.1.9 Industrial Applications

| Candidates should be able to:	Range of activities:
(a) understand the following commercial production methods: (2b) job production; (also known as 'one-off', 'jobbing', 'craft' production)	understand that this involves producing 'one off' products. Every item produced is different. It is labour intensive.
batch production; (2c)	understand that this involves the production of a specified quantity of a product. Batches can be repeated as many times as required. This type of production method is flexible and can be used to produce batches of similar products with only a small change to the tooling. e.g. using stencils and templates
repetitive flow (also known as 'assembly line');	*understand that this involves producing large numbers of identical products for a relatively low cost. The production is usually broken down into sub assemblies of smaller components. This form of mass production can be labour intensive or completely automated depending on the product being manufactured.*
continual flow process (also known as continuous flow');	*understand that this involves uninterrupted 24 hrs/day production of a basic commodity such as steel, chemicals, oil or basic food products. This type of production continues because it is expensive to shut down and then re-start. Only a small workforce is needed to maintain the process.*
(b) understand the following commercial manufacturing systems;	
in-line assembly;	*understand that this is used to mass produce many everyday items, sandwiches. Many in-line assembly systems are fully automated and only require people to ensure continual flow.*

	just in time;	this philosophy requires materials, components and sub-assemblies to arrive from other factories 'just in time' for production. Finished products are despatched immediately they are made. This system reduces any storage of stock and allows for changes to the product to be made quickly without the need to use up stock items first
	logistics.	understand that the production of products relies upon the availability of materials and components when required.
(c)	understand the packaging, marketing, and advertising implications of a product;	information about the product, consumer preference, legislation, labelling, legal requirements, storage, distribution, *cultural and European influences.*
(d)	understand that quality control is a necessary part of production and marketing.	procedures to ensure a quality product, *quality guarantees*, *consumer rights e.g. ISO 9000*
	(2c)	understand that quality control helps to ensure that the customer is satisfied with a product
		understand that a product should meet the criteria listed in the specification

5.1.10 Good Working Practice

LP2.3 WO2.2, LP1.1, LP2.2

Candidates should be able to:	Range of activities:
devise strategies to make effective use of available resources to:	When planning their work candidates should be able to:
(a) produce process and block diagrams;	identify available materials, components, equipment and facilities
	establish an order for work, identifying subtasks that need to be done first
	organise their work to maximise the use of available time and resources
(b) produce time plans and work schedules; (1d)	produce time plans, flow charts *using standard symbols*
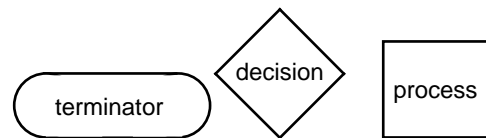
Candidates should be able to:	Range of activities:
(c) carry out testing, evaluation and modification of products. (3b)	simple trialling of products results collected, *charted* and analysed relevant modifications made

5.1.11 Product Evaluation

C2.1, WO1.3, WO2.3, LP2.3, PS1.3, PS2.3

Candidates should be able to:	**Range of activities:**
(a) review their work at critical points and apply quality assurance techniques; (3b)	regular checks to ensure a quality outcome
(b) evaluate the proposed product against: its fitness for purpose; the design need; the needs of the intended user(s); (3c)	critical evaluation related to initial specification and use of resources
(c) evaluate the proposed product against moral, cultural and environmental issues for the intended user;	sustainable sources of material supply and disposal/recycling of redundant products
(d) review whether they have used materials and resources appropriately;	detailed testing with meaningful conclusions
(e) carry out testing, resulting in conclusions that suggest necessary modifications. Analyse the performance of the manufacturing control system.	proposal for further development, suggest modifications or improvements to: (i) product (ii) template or mould

5.2   KNOWLEDGE AND UNDERSTANDING

5.2.1 Materials and Pre-manufactured Standard Components
(4a, 4b, 4c, 4d, 4e)

Candidates should, whilst working with food, explore food as a material, knowing and understanding the following:

- the composition, structure and properties of food as a material:

- the basic characteristics of food; colour, taste, texture, smell;

- the nutrients found in and the structure of a range of common foods, including cereals, fruit, vegetables, meat, fish, cheese, fats and oils, milk and eggs;

- the relationship between the composition, structure, characteristics and properties of food and the way in which it is prepared, cooked, served, stored, processed and preserved;

- the way in which the composition of food, gives food its characteristics and working properties e.g. to thicken, to set, to aerate, to coagulate, by altering the amounts and/or constituent foods in a recipe;

  factors that affect food, i.e. heat, cold, the removal of moisture, acids, alkali, oxidation, enzymes, yeasts, moulds, bacteria, additives, preservatives;

- how modern or 'smart' food materials i.e. modified enzymes, starches, antioxidants, genetically engineered foods, synthetic flavours are used to provide certain properties in food products i.e. using starches that are chemically modified to set at high temperature and then become fluid again at low temperature;

- investigation of food products aimed at different groups of people with different dietary requirements eg vegetarians, diabetics, coeliacs, calorie controlled, those with allergies;

- other factors that affect people's choice of food, e.g. availability, cost, personal preferences, cultural preferences, lifestyle, health, storage and cooking facilities, recent food tends and issues e.g. BSE, listeria, Escherichia coli.

Candidates should explore the use of components. For example:

- frozen pastry (e.g. shortcrust, filo, puff);

- decorations (vermicelli, ready-made icing, marzipan);

- ready-made pie fillings;

- canned or dried sauces, soups etc;

- pizza bases;

- appropriate materials used in packaging.

5.2.2 Systems and Control   (5a)

Candidates should develop an understanding of control systems, to include:

• know that a system has three elements, input, process and output; i.e. raw materials – making the product – packaged final product. Time schedules, flow charts, time charts;

• know the importance of feedback to their own system eg weight and mix control, trading standards regulations, environmental health; temperature control, control by thermostats/sensors. Shelf life and storage, time control;

• an understanding of the use of control systems; Hazard Analysis and Critical Control Points (HACCP);

• *an analysis of the effectiveness of the performance of the system i.e. consumer feedback.*

5.2.3 Products and Applications   (6a)

Candidates should be able to carry out a product analysis of commercially manufactured products and their applications. The process should include the following:

- suitability of the product and its intended market, i.e. different age groups /specialist diets, lifestyle demands;

- an understanding of the choice of materials and components e.g. the reason for yeast in a dough mix;

- what processes have already been carried out, and the scientific reasons behind them e.g. blanching of frozen vegetables;

- *what alternative similar products are available and what makes this product more attractive e.g. comparison of different brands of the same product.*

5.2.4 Quality   (2c, 3d, 3c)

Candidates should understand how to distinguish between quality of design and quality of manufacture by drawing on their experience and understanding of existing products and applications including:

- the evaluation and testing of a food product considering its fitness for purpose, appropriate use of resources and its method of production;

- quality control and quality assurance;

- *the impact of food packaging on the environment i.e. re-cycling possibilities, bio-degradable materials;*

- safe shelf life for a food product, data stamping, storage temperature;

- *its social and aesthetic implications, the impact of the quality of the presentation/ packaging for the intended market.*

5.2.5 Health and Safety   (2a)

Candidates should understand health and safety as designers, manufacturers and consumers.

Candidates should be able to:

- use a range of tools and equipment in a safe and efficient manner;

- understand the need to consider Risk assessment and safety information;

- understand the importance of safe and hygienic practices in the preparation, cooking, transportation and storage of foodstuffs;

- understand the need for legislation to ensure Health and Safety in the food industry;

- understand the need for Health and Safety legislation to protect the consumer;

- understand the need to consider:
    (i)   the reduction in the common use of chemicals dangerous to the environment i.e. bleaches, CFC's toxic metals;
    (ii)   the need to dispose of redundant products in a safe and environmentally friendly way.

SECTION D: COURSEWORK

6 Coursework Tasks

6.1 NATURE OF COURSEWORK PROJECT

Candidates are required to produce a Resistant Materials product that can be marketed. The underlying influence on the project should be that the product will be the first of a batch of 50, realised in school/college with the facilities that are available. The candidate will realise the first, or the prototype of this product.

The evidence required to be submitted for assessment must include a 3 dimensional product with a concise portfolio (including evidence of modelling) and/or appropriate ICT evidence. Centres are reminded that ICT evidence must address the requirements of the six Internal Assessment Objectives. Evidence which does not lead to a finished product can be assessed if it is felt that it represents work appropriate to the focus of the project.

This project will be assessed against the following six internal assessment objectives:

1 identify a need or opportunity that leads to a design brief;

2 conduct research into the design brief which results in a specification;

3 generate possible ideas for a solution;

4 develop the product for manufacture;

5 plan and realise the product;

6 evaluate and test the product.

It is envisaged that the coursework project presented for assessment will represent 40 hours of work. Some of the work, by its very nature, may be undertaken outside school e.g. research work, testing etc.

6.2 EXEMPLAR COURSEWORK TASKS

Candidates may select one of the following statements as a starting point for the coursework project. Through investigating the statement, candidates can devise their own design brief based on their interests and ability.

It is not compulsory to select an area of design from the list. Teachers and/or candidates can devise their own starting point. OCR coursework consultants are available for advice if required.

In order to contact coursework consultants, Centres should use Coursework Task Proposal forms supplied to Centres in a Coursework Administration Pack or download the form from the OCR website: www.ocr.org.uk

1 A large supermarket chain has found that many people today have special dietary requirements whose needs are not always met in the range of products they offer.

2 A number of people today buy food products according to their ethnic or moral beliefs. Investigate.

3 The market for between-meal snacks grow continually. A food manufacturer is keen to meet this demand.

4 Many food manufacturers have responded to the demand made by returning holiday makers by developing a range of food products from different cultures. Investigate.

5 Many nutritionalists are concerned how little fruit and vegetables are eaten today. Investigate.

6 As concern about the health of the nation increases, supermarket chains have responded by selling healthier food products. Research shows that many people still continue to eat food products that do not always meet the current dietary recommendations.

7 Many people celebrate special occasions. Food manufacturers are always keen for new ideas to increase their sales of novelty foods.

8 Staple foods form important basis for many food products. Food manufacturers are always keen for new ideas to increase their sales of food products made from staple foods.

9 As family lifestyles and eating patterns continually change, food manufacturers have responded by developing a range of' ready to eat' food products.

10 Milk, eggs and cheese form important ingredients for many food products. Food manufacturers are always keen for new ideas to increase their sales of food products made from these protein foods.

11 Because of changes in our society there is now an increasing demand for 'single portion' food products. A supermarket chain is keen to respond to this situation.

12 The market for microwavable food products grows continually. A food manufacturer is keen to meet this demand.

13 For food manufacturers producing cakes, biscuits and pastries to maintain their competitiveness they have to have to update continually their image and find ways of meeting the changing needs of their customers.

14 The market for desserts grows continually. A food manufacturer is keen to meet this demand.

6.3 EXPANSION OF AN 'EXEMPLAR COURSEWORK TASK'

Task 3: The market for between meal snacks grows continually. A food manufacturer is keen to meet the demand.

Internal Assessment Objective 1 - Identification of a need leading to a design brief

A brief description of the need for a between-meal snack

A consideration of the potential user group for the product. A clear statement of a design brief that will lead to a marketable product.

Internal Assessment Objective 2 - Research into design brief resulting in a specification

Evaluate existing products using a range of communication techniques. Include a chart and analysis. Select 6 products giving information in depth for 2 of these.

Distribute appropriate questionnaires to a minimum 6 and a maximum 10 people. Analyse the responses.

Research from a variety of sources.

Consider a range of information associated with packaging/labelling

Consider 2 commercial production methods such as job and batch production

Consider HACCP

Collect other information appropriate to task.

Write a detailed specification which shows consideration of a quantity production system.

Internal Assessment Objective 3 - Generation design solutions

Produce an action plan.

Consider 6 product proposals. If the products are complex (e.g. lemon meringue pie) reduce to 2.

Using at least 3 people, test, taste and evaluate the products.

Internal Assessment Objective 4 - Product development

Adapt proposals and develop a final product.

Apply further testing, tasting.

Give full details of the final proposal including a final production specification

Internal Assessment Objective 5 - Product planning and realisation

Produce a plan of action for the production of the final product

Produce the final marketable product

Internal Assessment Objective 6 - Evaluation and Testing

Test and taste using 3 intended users.

Make reasoned conclusions and suggest any modifications that could improve the product

Analyse the performance of the manufacturing control system.

7   Regulations for Internal Assessment

7.1   SUPERVISION AND AUTHENTICATION OF COURSEWORK PROJECTS

OCR expects teachers to supervise and guide candidates who are undertaking work which is internally assessed (e.g. coursework project). The degree of teacher guidance in candidates' work will vary according to the work being undertaken. It should be remembered, however, that candidates are required to reach their own judgements and conclusions.

When supervising internally assessed coursework projects, teachers are expected to:

*   Offer candidates advice about how best to approach their work.

*   Exercise continuing supervision of work in order to monitor progress and to prevent plagiarism.

*   Ensure that the work is completed in accordance with the specification requirements and can be assessed in accordance with the internal assessment objectives and procedures.

Internally assessed coursework projects should be completed in the course of normal curriculum time and supervised and marked by the teacher. Some of the work, by its very nature, may be undertaken outside the Centre eg research work, testing etc. As with all internally assessed work, the teacher must be satisfied that the work submitted for assessment is the candidate's own work.

7.2   PRODUCTION AND PRESENTATION OF INTERNALLY ASSESSED COURSEWORK PROJECT

Candidates must observe certain procedures in the production of internally assessed work.

*   Any copied material must be suitably acknowledged.

*   Quotations must be clearly marked and a reference provided wherever possible.

*   Work submitted for moderation must be marked with the:

*   Centre number
    Centre name
    Candidate Number
    Candidate Name
    Specification title and code i.e: OCR GCSE in Design and Technology (Food Technology) 1954
    Coursework project title.

7.3 MARKING CRITERIA FOR INTERNALLY ASSESSED WORK

This specification requires candidates to demonstrate fully their design and technology capability. They should combine skills with knowledge and understanding in order to design and make quality products.

The assessment objectives:

- of materials, components, processes, techniques and industrial practice (AO1);
- for designing and making quality products (AO2);
- for evaluating processes and products and examining the wider effects of design and technology on society (AO3),

are assessed, in an integrated way, through the six **Internal Assessment Objectives** shown below.

Internal Assessment Objectives		Specification Assessment Objectives		
		AO1	AO2	AO3
1	Identification of a need or opportunity leading to a design brief		2	2
2	Research into design brief resulting in a specification	2	6	4
3	Generation of design proposals	2	8	2
4	Product development	6	4	2
5	Product planning and realisation	10	40	2
6	Evaluation and testing			8
	Total Marks	**20**	**60**	**20**

The weighting of the marks provides an indicator of the time that candidates should spend on each part of the project.

It is envisaged that the coursework project presented for assessment will represent 40 hours work. Some of the work, by its very nature, may be undertaken outside school e.g. research work, testing etc.

7.3.1 Assessment of the Overall Presentation of the Coursework Project

This specification provides for an assessment of the overall presentation of the coursework project. Marks are awarded on the basis of a candidate's overall performance in presenting work throughout the project portfolio. Details are given in Section 7.3.4.

7.3.2 Guidance for Teachers

It is appreciated that for assessment purposes, the **Internal Assessment Objectives** have been written in a linear form. However, within focus areas of Design and Technology, some stages may interrelate and be cyclical in approach.

This specification requires candidates to produce a food product that can be marketed. The underlying influence on the project should be that the product will be the first of a batch of 50, realised in school/college with the facilities that are available. The candidate will realise the first, or the prototype of this food product.

The type of product selected should be challenging, but realistic in terms of resources and time available. Candidates are actively encouraged to think about the needs/requirements of the user group and the situation the product will be used in. It is vital that a design brief is established at the beginning of the process, to enable candidates to focus their research. (Some centres provide the candidates with a set theme as a starting point, others allow individuals to recognise their own design need/opportunity.)

Having established a design brief, candidates need to extend their understanding of the situation by collecting, documenting and analysing relevant data. Candidates should be encouraged to use ICT where appropriate. Digital cameras, scanned and downloaded images, internet and CD-ROM access can all provide opportunities for candidates to document information. Feedback from the intended user group about the requirements and expectations of the product can be obtained via a survey or in-depth interview with an expert. Product analysis of similar products already available can inform opinions about human interaction, product functions, value for money etc. The design specification provides a clear understanding of all the major design requirements needed to make the product successful. The candidate should acknowledge the considerations for quantity production as part of the specification. Quick Initial design ideas can be developed and modelled. Trialling will provide additional details about possible solutions. The final design selection needs to be discussed and justified against the original design specification. Where appropriate, candidates should consider the use of 'smart' and modern materials.

During the product development section, candidates need to develop their idea towards a final product. They test food and other materials, production methods and packaging. The results need to be recorded and decisions justified. Exact quantities, sizes and shapes/forms of components are established. ICT may be used to show costing, nutritional information and record consumer preference etc. Candidates are to select and use appropriate devices that can be used as part of a system to maintain consistency during the manufacture of their product. The success of this device is assessed during the evaluation report.

Prior to realisation, candidates need to plan the order of work, the processes, tools and equipment to be used. Time plans help to keep the candidate on target. Using a range of skills and techniques, candidates are expected to make a quality product that meets the requirements of the design specification.

The evaluation report provides the opportunity for the candidate to analyse the outcome against the original specification and whether they have used the correct materials, equipment etc. Full product testing will establish the success of the product and consumer/user group opinions will inform suitable modifications and further product development. An evaluation of the system designed to maintain consistency during production would establish its effectiveness and need for further improvements.

7.3.3 Applying the Internal Assessment Objectives to Candidates' Work

Each Internal Assessment Objective has four 'level of response' boxes containing hierarchical statements. Initially a 'best fit' should be established and the mark awarded within the appropriate mark range.

The marks have been broken down into ranges of marks for the hierarchical statements within each level of response box.

This breakdown enables positive marking of a coursework project by allowing the teacher to match statements from any of the level of response boxes against the evidence offered by the candidate.

This approach can be applied to each assessment objective using the marks in brackets [ ] as indicated.

For example when marking internal assessment objective 5, a project may reflect:

Little or no planning [3]

Has overcome problems as they arise etc. [6]

With a normal level of supervision, has combined a range of skills
and techniques etc. [9]

The product will exhibit a reasonable standard etc. [8]

Total Mark   **26**

Internal Assessment Objective 1

TOTAL MARKS 4

Identification of a Need or Opportunity leading to a Design Brief	Level of Response	Mark Range
Candidates will need to: • provide a description of the design need using various means of communication; • identify the range of users and the market for which the product is intended; • develop a design brief for a marketable product.	A statement of what is to be made.	**0-1**
	Some consideration of the design need or the intended user/users leading to a design brief.	**2**
	Consideration of both the design need and the intended user/users leading to a clear design brief of a marketable product.	**3**
	Detailed description of both the design need and user/users leading to a clear and precise design brief of a marketable product.	**4**
	Total	**4**

Internal Assessment Objective 2   **TOTAL MARKS 12**

Research into the Design Brief which Results in a Specification	Level of Response		Mark Range
Candidates will need to: • examine the intended purpose, form and function of the product; • undertake appropriate surveys, identifying and evaluating how existing products fulfill the needs of their intended users; • identify and collect data relevant to the product(s) and its users; • develop a detailed specification and criteria that includes the capability for batch production.	Limited research of intended use.	[1]	**0-3**
	Some recognition of existing products.	[1]	
	A specification identifying some basic requirements.	[1]	
	Intended use of product examined with some data identified or collected.	[2]	**4-6**
	Existing products identified with some evaluation.	[2]	
	A specification identifying some key features including a suggestion of how more than one could be made.	[2]	
	Intended use of product examined with data identified and collected.	[3]	**7-9**
	Existing products identified and evaluated considering some of the needs of the intended user/users.	[3]	
	A detailed specification containing some reference to a system required to manufacture in batches.	[3]	
	Intended use of product fully examined with relevant data identified and collected.	[4]	**10-12**
	Existing products identified and fully evaluated against the needs of the intended user/users.	[4]	
	Analysis of the research and information sources leading to a detailed design specification that would provide a system to ensure control over the production of the product in batches.	[4]	
		Total	**12**

Internal Assessment Objective 3   **TOTAL MARKS 12**

Generation of Design Proposals	Level of Response		Mark Range
Candidates will need to**:** • generate a range of design proposals; • check design proposals against design specification and review and modify them if necessary; • identify chosen design proposal for product development; • present design solutions using a range of graphic techniques and ICT including computer-aided design (CAD), to generate, develop, model and communicate design proposals.	One or more solutions proposed. [1] Little or no evaluation. [1] The work displays a low standard of communication techniques. [1]		**0-3**
	Several solutions proposed. [2] A cursory evaluation. Unsupported choice of design proposal. [2] Communication will be of a reasonable standard using a limited number of techniques. [2]		**4-6**
	A range of appropriate solutions proposed. [3] Design proposal chosen, supported by clear evaluation. [3] Communication will be of a good standard, using a range of appropriate techniques. [3]		**7-9**
	A wide range of appropriate solutions proposed. [4] Design proposal chosen as a result of detailed evaluation and consideration of the need and fitness for purpose. [4] Communication will be of a high quality, using a wide range of appropriate techniques. [4]		**10-12**
		Total	**12**

Internal Assessment Objective 4   **TOTAL MARKS 12**

Product Development	Level of Response		Mark Range

Candidates will need to:
 	
• as a result of investigation, testing or trialling, make reasoned decisions about:
• materials;
• production methods;
• pre-manufactured standard components.
 	
• consider how materials are prepared for manufacture and how pre-manufactured standard components are used;
 	
• by modelling, apply test procedures ensuring the product meets the original design brief and its fitness for purpose;
 	
• consider when developing the product, the implications for quantity manufacture of:
   (i)   materials and components;
   (ii)   tools, equipment and processes;
   (iii)   critical dimensions and tolerances.
 	
• develop a control system to be used in the manufacture of their product;
 	
• be flexible and adaptable in responding to changing circumstances and new opportunities;
 	
• make any necessary modifications to the chosen design;
 	
• give details of the final design including a final product specification;
 	
• present design solutions using a range of graphic techniques and ICT including computer-aided design (CAD), to develop, model and communicate design proposals.
	Some materials and production methods identified.
	
	Has attempted to model part of final solution.
	
	Limited details given for final solution.
		[1]
		
		[1]
		
		[1]
			0-3

	As a result of investigations some decisions made about materials, production methods function and pre-manufactured items. Has used modelling to check that the product meets the design brief. Some important details given about the final product and how more than one of the product could be made.	[2] [2] [2]	**4-6**
	Some testing and trialling resulting in decisions about materials, production methods and pre-manufactured items. Used modelling and testing to ensure that the product meets the design brief. Most details given about final product and the control system needed to produce the product in quantity.	[3] [3] [3]	**7-9**
	Appropriate testing and trialling resulting in reasoned decisions about materials, production methods and pre-manufactured items. Has used modelling and test procedures to identify any necessary modifications and to ensure the product meets the design brief. Full details about the final product and the control system needed to produce the product in quantity.	[4] [4] [4]	**10-12**
		Total	**12**

Product Planning and Realisation	Level of Response		Mark Range
Candidates will need to: • produce a plan of action which considers: materials, pre-manufactured items, equipment, processes and health and safety issues against an order of work and the need to make products that match the design specification; • select and use tools, equipment and processes effectively and safely; • economically prepare materials/ pre-manufactured items for production, allowing for waste and fine finish; • complete a quality outcome suitable for the intended user or users, ensure that their outcome functions effectively; • be prepared to adapt working procedures in response to changing circumstances; • use a range of skills and techniques appropriate to the task; • where appropriate apply a range of industrial techniques when working with familiar materials and processes.	Little or no planning.	[3]	**0-13**
	Has used a limited range of materials, tools and equipment.	[3]	
	With frequent prompting uses basic skills and techniques appropriate to the task. Little understanding of safe working practices.	[3]	
	The product will exhibit a low standard of outcome and may not be successfully completed.	[4]	
	Planning will have been restricted to the immediate task and will have relied on prompting.	[6]	**14-26**
	Has overcome problems as they arise using appropriate materials, tools and equipment.	[6]	
	With some guidance has used a range of skills and techniques appropriate to the task. Reasonable understanding of safe working procedures.	[6]	
	The product will exhibit a reasonable standard of outcome, be mainly complete and will satisfy the specification with a limited degree of success.	[8]	
	Most of the realisation will have been planned in advance.	[9]	**27-39**
	Has made economic and efficient use of materials, tools and equipment modifying the application of these if appropriate.	[9]	
	With a normal level of supervision, has combined a range of skills and techniques appropriate to the task. Good understanding of safe working procedures.	[9]	
	The product will exhibit a good standard of outcome, will be complete and will function as intended.	[12]	
	The realisation will have been thoroughly planned to specify an effective order for the sequence of operations.	[12]	**40-52**
	Resourceful and adaptable with materials, tools and equipment and to a high degree of precision.	[12]	
	Has independently combined a range of skills and techniques appropriate to the task. High understanding of safe working procedures.	[12]	
	The product will be completed to a high quality and will fully meet the requirements of the final product specification.	[16]	
		Total	**52**

Internal Assessment Objective 6

TOTAL MARKS 8

Evaluation and Testing	Level of Response		Mark Range
Candidates will need to: • evaluate their products to ensure that they are of a suitable quality for intended users; • carry out testing, resulting in reasoned conclusions that suggest any necessary modifications to improve the product; • review whether they have used resources appropriately e.g. time, materials, equipment, and production methods; • analyse the performance of their manufacturing control system in the production of the prototype.	Relevant un-supported comment with some reference to the specification. No evidence of testing.	[1] [1]	**0-2**
	Some supported comment with reference to the specification and use of resources. Superficial testing with a conclusion.	[2] [2]	**3-4**
	Relevant comments with reference to the specification and use of resources. Relevant testing with few conclusions, leading to a possible modification or improvement of product and/or system designed to control manufacture.	[3] [3]	**5-6**
	Critical evaluation related to the specification and use of resources. Detailed testing with meaningful conclusions leading to proposals for further development, modification or improvements of product and system designed to control manufacture.	[4] [4]	**7-8**
		Total	**8**

7.3.4 Assessment of the Overall Presentation of the Coursework Project

An assessment of the overall presentation of the project is provided for the internally assessed component of this specification.

Marks are awarded on the basis of a candidate's overall performance in presenting work throughout the project portfolio. Performance criteria are given below to assist with the allocation of marks.

Teachers should first assess the candidate's project portfolio against the six **Internal Assessment Objectives**. The performance criteria for presentation should then be applied, and marked according to the table given below.

Performance Criteria	Mark Range
Below threshold performance	**0**
Threshold performance Candidates present their ideas with reasonable care in a format that can be followed.	**1**
Intermediate performance Candidates present their ideas with care in an appropriate sequence.	**2-3**
High performance Candidates present their ideas adeptly in a logical and concise way.	**4-5**

7.4 MODERATION

All internally assessed work is marked by the teacher and internally standardised by the Centre. Marks are then submitted to OCR by a specified date, after which moderation takes place in accordance with OCR procedures. The purpose of moderation is to ensure that the standard of the award of marks for internally assessed work is the same for each Centre and that each teacher has applied the standards appropriately across the range of candidates within the Centre.

The sample of work which is presented to the Moderator for moderation must show how the marks have been awarded in relation to the internal assessment objectives defined in Section 7.3.

Where it is not clear within a project folder, by the candidate's own presentation of work, where the marks have been awarded, annotation must be carried out by the person marking the work.

7.5 MINIMUM REQUIREMENTS FOR INTERNALLY ASSESSED WORK

There should be clear evidence that work has been attempted and some work produced.

If a candidate submits no work for an internally assessed component, then the candidate should be indicated as being absent from that component on the mark sheets submitted to OCR. If a candidate completes any work at all for an internally assessed component then the work should be assessed according to the internal assessment objectives and marking instructions and the appropriate mark awarded, which may be zero.

SECTION E: FURTHER INFORMATION

8 Opportunities for Teaching

8.1 ICT

In order to play a full part in modern society, candidates need to be confident and effective users of ICT. Where appropriate, candidates should be given opportunities to use ICT in order to further their study of Food Technology.

The assessment of this course requires candidates to use ICT through preparing, presenting, and reviewing information as they work on their design ideas, developing models that communicate these ideas, and making products using computer-aided manufacture (CAM).

This section offers guidance on opportunities for using ICT during the course. These opportunities are also indicated within the content of Section C by a ▨ symbol. Such opportunities may or may not contribute to the provision of evidence for IT Key Skills. Where such opportunities do contribute, they are identified by the use of the ▨ symbol.

ICT Application	Opportunities for Using ICT during the Course
Database	Sections 5.1.1, 5.1.8, 5.1.11
Internet	Sections 5.1.2, 5.1.8
Word Processing	Sections 5.1.2, 5.1.8, 5.1.11
Spreadsheet	Sections 5.1.5, 5.1.8
CAD	Sections 5.1.3, 5.1.4, 5.1.6, 5.1.8
CAM	Sections 5.1.8, 5.1.9, 5.1.10

8.2 CITIZENSHIP

From September 2002, the National Curriculum for England at Key Stage 4 includes a mandatory programme of study for Citizenship. Parts of this programme of study may be delivered through an appropriate treatment of other subjects.

This section offers guidance on opportunities for developing knowledge, skills and understanding of citizenship issues during the course. These opportunities are also indicated within the content of Section 5 by a ▨ symbol.

Citizenship	Opportunities for Teaching Citizenship Issues during the Course
Consider the needs of others	Section 5.1.1
Consider issues surrounding a particular product and its surroundings	Section 5.1.2
Seek opinions of others and be flexible and adaptable in responding to their needs	Sections 5.1.3/4
Consider the need to work together as a team	Section 5.1.9
Seek the opinions of others	Section 5.1.11
Consider the health and safety of others	Section 5.2.5

8.3 SPIRITUAL, MORAL, ETHICAL, SOCIAL AND CULTURAL ISSUES

The specification provides opportunities to promote:

- spiritual development, through helping pupils recognise their own creativity and the creativity of others in finding solutions to problems, and through recognising the tension between material and non-material needs;

- moral development, through helping pupils to reflect on how technology affects the environment so they can make informed choices when designing and making and through discussing the moral dilemmas posed by introducing new technologies within different values systems and the advantages and disadvantages of new technology to local, national and global communities;

- social development, through helping pupils recognise the need to consider the views of others when discussing design ideas;

- cultural development, through exploring the contribution of products to the quality of life within different cultures, and through valuing and reflecting on the responses of people from other cultures to design solutions.

8.4 HEALTH, SAFETY AND ENVIRONMENTAL ISSUES

OCR has taken account of the 1988 Resolution of the Council of the European Community and the Report Environmental Responsibility: An Agenda for Further and Higher Education, 1993 in preparing this specification and associated specimen assessments.

The specification provides opportunities to promote education for sustainable development, through developing knowledge and understanding of the principles of sustainable design and production systems, developing skills in creative problem solving and evaluation, and exploring values and ethics in relation to the application of design and technology. Whilst candidates will not be specifically assessed in terms of their knowledge and awareness of issues associated with energy usage it is anticipated that, whenever possible, candidates will be encouraged to consider the benefits and drawbacks associated with the use of different sources of energy.

The specification content includes a specific requirement to consider issues associated with health and safety and the environment. See Section 5.

8.5 THE EUROPEAN DIMENSION

OCR has taken account of the 1988 Resolution of the Council of the European Community in preparing this specification and associated specimen assessments. European examples should be used where appropriate in the delivery of the subject content. Relevant European legislation is identified within the specification where applicable. See section 5.

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9 Key Skills

Key Skills are central to successful employment and underpin future success in learning independently. Whilst they are certificated separately, the Key Skills guidance for this qualification has been designed to support the teaching and learning of the content. Opportunities for developing the generic Key Skills of Communication, Application of Number and Information Technology are indicated through the use of a 'key symbol' in Section 5. The wider Key Skills of Working with Others, Problem Solving and Improving Own Learning and Performance may also be developed through the teaching programmes associated with the specification.

The following matrix indicates where coverage exists within the specification.

	Communication	Application of Number	IT	Working with Others	Improving Own Learning and Performance	Problem Solving
Level 1	✓	✓	✓	✓	✓	✓
Level 2	✓		✓	✓	✓	✓

Detailed opportunities for generating Key Skills evidence through this specification are posted on the OCR website. A summary document for Key Skills coordinators showing ways in which opportunities for Key Skills arise within GCSE courses will be published during 2001.

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10 Resources List

At the time of publication of this specification, Heinemann is preparing a textbook and teacher's resource file to accompany this course. It will be endorsed by OCR for use with this specification, subject to OCR's quality assurance procedure before final publication. For further details, please contact either the Design and Technology team at OCR Birmingham Office or Heinemann direct on 01865 311366.

Jenny Ridgwell	GCSE Food Technology for OCR Student Book 2nd edition	ISBN 0435 41951 X
Jenny Ridgwell with Alison Wonson	GCSE Food Technology for OCR Teacher's Resource File 2nd edition	ISBN 0435 41952 8

11 Arrangements for Candidates with Special Needs

For candidates who are unable to complete the full assessment or whose performance may be adversely affected through no fault of their own, teachers should consult the Inter-Board Regulations and Guidance Booklet for Special Arrangements and Special Consideration.

In such cases, advice should be sought from the OCR Special Requirements team (telephone 01223 552505) as early as possible during the course.

A Certificate of Achievement (COA) specification is also available and may be more suitable for some candidates.

12 Support and In-service Training for Teachers

To support teachers using this specification, OCR will make the following materials and services available:

- a full programme of In-Service training meetings arranged by the Training and Customer Support Division (telephone 01223 552950);

- specimen question papers and mark schemes, available from the Publications department (telephone 0870 8706622; fax 0870 8706621);

- past question papers and mark schemes, available from the Publications department (telephone 0870 8706622; fax 0870 8706621);

- written advice on coursework proposals;

- a report on the examination, compiled by senior examining personnel after each examination session;

- individual feedback to each Centre on the moderation of internally assessed work.