Design and Technology

GCSE 2012

D&T: Product Design

Specification

J305 – Full Course

J045 – Short Course

Version 1

April 2012

OCR

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OCR GCSE in Design and Technology: Product Design J305/J045

Contents

1 Introduction to GCSE Design and Technology: Product Design

1.1 Overview of GCSE Design and Technology: Product Design Full and Short Course

A551 *Developing and Applying Design Skills*	Controlled assessment Internally assessed and externally moderated 20 hours – 90 marks 60% of the Short Course qualification 30% of the Full Course qualification
+	
A552 *Designing and Making Innovation Challenge*	Innovation Challenge within examination conditions 6 hours plus 30 mins reflection time – 60 marks 40% of the Short Course qualification 20% of the Full Course qualification
+	
A553 *Making, Testing and Marketing Products*	Controlled assessment Internally assessed and externally moderated 20 hours – 90 marks 30% of the Full Course qualification only
+	
A554 *Designing Influences*	Written Paper 1 hour 30 mins – 60 marks 20% of the Full Course qualification only

1.2 Guided learning hours

GCSE Design and Technology: Product Design requires 120–140 guided learning hours in total.

GCSE (Short Course) Design and Technology: Product Design requires 60–70 guided learning hours in total.

1.3 Aims and Learning Outcomes

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

GCSE specifications in design and technology must enable learners to:

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

The aims of these specifications are to:

- provide the opportunity to develop candidates' design and technology capabilities and, in particular, to encourage imagination, innovation and flair
- encourage candidates to combine their designing and modelling skills with knowledge and understanding, in order to produce outcomes capable of being rigorously tested
- promote design and technology capability in candidates through activities which involve a range of contexts, materials and processes and lead to tangible outcomes
- give candidates the confidence to design, make and modify products for identified purposes, selecting and using resources effectively
- promote the use of graphic techniques and ICT, including computer-aided design (CAD), in order to generate, develop, model and communicate design proposals
- promote the use of computer-aided manufacture (CAM) in single-item production and in batch or volume production
- 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
- encourage the development of candidates' consideration of function and ergonomics

- encourage the development of candidates' understanding of the needs and values of a range of users, including spiritual, moral, social, and cultural considerations
- promote the Keys Skills of Communication, Application of Number, IT, Working with Others, Improving Learning and Performance, and Problem Solving
- encourage the development of candidates' thinking skills, financial capabilities, enterprise and entrepreneurial skills
- encourage the development of candidates' understanding of work-related learning and the principles of sustainable design and production systems
- encourage candidates to consider how present and past design and technology, relevant to a designing and making process, affect society
- encourage candidates to recognise that the work of past designers can influence the development of design thinking
- encourage candidates to consider the uses and effects of new technologies and modern materials on product design and manufacture
- provide for activities that 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.

1.4 Prior learning/attainment

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

Content of GCSE Design and Technology: Product Design

2

2.1 Unit A551: *Developing and Applying Design Skills*

2.1.1 Developing and writing a design brief

Candidates should be able to:

- provide a detailed description of the design need using various means of communication
- extract from verbal, visual and statistical information the essential problems to be solved
- identify the range of users and the market for which the product is intended
- develop a design brief for a marketable product which is innovative and might involve some degree of risk taking.

2.1.2 Drawing up a specification

Candidates should be able to:

- identify and collect relevant data about the user(s)
- examine the intended purpose of the intended product
- identify and collect other data relevant to the product and its users
- examine the intended purpose of existing products
- identify opportunities for developing new and innovative products to improve upon the weaknesses of existing products
- understand the issues that expand the design brief
- detail the requirements of the product
- demonstrate an ability to express the results of research and analysis in the form of a suitably detailed specification.

2.1.3 Generating design proposals

Candidates should be able to:

- generate and record the development of design proposals that are innovative and show flair and imagination
- consider user needs and issues when developing ideas
- consider aesthetics, ergonomics, function and the other design influences
- appraise design ideas for suitability, value and consequence
- identify, with reasons for selection/rejection, the chosen design proposal(s) for prototype manufacture
- use suitable communication techniques, including ICT, to develop and model design proposals and production systems
- use modelling to check on the feasibility of design ideas
- check that the design proposal meets legislative standards, and consider patents and copyrights
- control the development of the product for manufacture, and identify within the design proposals the resources needed for the prototype to be realised
- consider, using examples, those aspects of the design which could most easily be manufactured in quantity
- produce a final product specification.

2.2 Unit A552: *Designing and Making Innovation Challenge*

2.2.1 A552: Designing and Making Innovation Challenge

In this unit, candidates work within examination conditions, over 6 hours (two 3-hour sessions normally on consecutive days) and without the intervention of a teacher (except for administrative instructions and for reasons of health and safety).

Candidates should be able to:

- think with an 'open' mind about a design situation
- respond in ways which might appear at first 'unrealistic' yet, after consideration, provide a unique, valuable contribution to designing
- use collections of existing products as a stimulus for innovative design
- record thinking, innovation and flair
- demonstrate the ability to focus thoughts and be decisive within a set, limited time frame
- seek opinions of others and react accordingly
- reflect and record ideas as they develop
- present to a group and acknowledge feedback
- identify good design ideas worthy of further development and reject those of less value
- use modelling materials adeptly
- plan the use of materials and equipment
- make a product
- record progress using sketches and photographs
- reflect upon progress and identify possible further design development.

Theme

The following text is an example of a theme:

School Sports Day

On a school sports day, not all students participate in the sporting events.
The opportunities for these students still to be involved and support the event and the arrangements for the event are numerous.

Themes will appear in the pre-release material available on Interchange. Centres should ensure that the correct theme is used.

Synopsis

The Innovation Challenge is a teacher-led activity that stimulates and supports the candidate through a thought-provoking creative exercise. Much of the innovative designing is integrated into the trialling and testing of materials and systems.

The activity is designed to take place in a design room, studio or workshop (not the centre's examination hall). The candidates are encouraged to take risks, be innovative, take advice from others through controlled and structured peer evaluation, and use resources effectively and efficiently. OCR will publish a theme for each year which will outline a design context. On the day of the examination, candidates will have a choice of four different challenges to choose from, all of which are directly related to the theme.

Full instructions concerning the conduct for running this unit in a centre are provided in the teacher script.

The centre is asked to provide a 'handling collection', which may consist of existing products or pictures, video, etc relating to the theme, and an 'inspirational table' which shows examples of products with interesting features or capabilities. Further details are provided in the accompanying support material.

Throughout the challenge, candidates are asked to record and communicate their thinking on a pre-printed, A4-size answer booklet supplied by OCR. Candidates respond to the prompts in pre-numbered boxes.

Midway through session 1, candidates have the opportunity to present their ideas to a group of between three and four other candidates. Candidates are encouraged to take advice from others through this controlled and structured peer evaluation.

Candidates model their most creative and exciting idea using a range of easy-to-handle materials. Depending upon the activity, they can choose from paper, card, thin plastics, fabric, wire, foil, thin metal sheet, clay, polymorph, foam board, food ingredients, components, gaffer tape and other joining methods and devices. Marks are awarded for the design concept and the way in which the candidate has resourcefully used materials and construction techniques.

Four digital or 'Polaroid' photographs must be taken at specified times by the teacher or teaching and learning assistant to record individual progress. These must be able to be processed and attached to each candidate's answer booklet during the challenge.

Although prototype models are not required to be sent with the candidate answer booklets to the examiner, they should be retained as they may be required for monitoring purposes.

At the end of session 2, candidates have the opportunity to reflect on the challenge by completing a section in the answer booklet. Further details are given in the accompanying Teachers' Guide.

The timetable must be followed except in certain circumstances.

The OCR-appointed examiner assesses the evidence contained in the candidate answer booklets on completion of the activity.

Resources

Provided by OCR	Provided by centre (see the accompanying Teachers' Guide for more information)
Printed A4 answer booklets	Handling collection – products / video (linked to the context)
Teacher script	Inspirational products (linked to the context)
	Communicating media Modelling/making materials
	Digital camera / printer or Polaroid camera

Innovation Challenge Session 1 – Timetable		
Reference to OCR pre-printed answer booklet	**Activity**	**Time allocation (mins)**
	Introduction to the challenge	
	The handling collection or background information – teacher-led starter session The inspiration collection. Products with interesting features or capabilities	
1	Initial thoughts	6
2	Possible ideas	8
3 & 4	Decision time Brief Specification	15
5 & 6	Initial ideas	30
7	Reflect and Record	5
8	Group presentation planning (3/4 candidates per group) Introduction by teacher	20
	Break (15 minutes approx)	
9	Developing your idea	25
10	Question time	5
	Introduction to modelling kit	10
11	Your model	10
12	Action plan for session 2	6

Innovation Challenge Session 2 – Timetable		
Reference to OCR pre-printed answer booklet	**Activity**	**Time allocation (mins)**
13	Further thoughts	5
	Go make!	40
14	Progress report 1 (photo)	5
	Go make!	40
15 & 16	Progress report 2 (photo)	5
	Plan for last 40 minutes	
	Go make!	45
	Break (10 minutes approx)	
17	Final evaluation (photo)	6
18	Summing up	7
19	Specification check	15
	FINISH	
2	Time to reflect	30

2.3 Unit A553: *Making, Testing and Marketing Products*

2.3.1 Prototype manufacture

Candidates should be able to:

- make a 3D prototype using appropriate media – the prototype is to have working features to demonstrate how the product will function
- complete a production log of the stages of making the product
- select and use the appropriate tools, equipment and processes effectively and safely to make products that match the specification
- use tools and techniques to achieve precision
- use CAM where appropriate
- deploy a range of skills and techniques appropriate to the task, **(CAD/CAM is a single skill)**, including those necessary to ensure realism of the prototype product
- prepare and use materials economically
- select and use appropriate pre-manufactured components
- be prepared to adapt working procedures in response to changing circumstances
- demonstrate clear understanding of safe working practices.

2.3.2 Testing, evaluating and marketing

Candidates should be able to produce:

- a design concept page that includes details of the prototype product to be made and a related detailed specification
- evidence of testing and evaluation of the prototype product by a user / user group against the design criteria
- evidence of user / user-group feedback of the prototype product
- details of any review processes and necessary modifications to improve the final prototype product
- details of how the design prototype could be manufactured in quantity by either batch, repetitive flow, continual flow or other production system in the 'real world'
- marketing presentation – 'sales pitch' – in an interesting way to bring the product to the attention of one of the following:
  - a prospective manufacturer
  - a supplier
  - a company buyer
  - a retailer
  - an end user/user group
  - a consumer.

2.4 Unit A554: *Designing Influences*

Designing Influences Section A

Candidates should understand the influence upon designing of:

Social, moral and cultural issues	Ethical designs, socially responsible designs and the impact of different cultures on modern products such as Indian batik work, Islamic patterns and the differing meaning of colours within different cultures; lifestyle changes, e.g. the development of ready meals and the social and ethical implications of fashion and obsolescence; the responsibility of designers to adopt sustainable designs. Consideration of people with disabilities.
Environmental factors	Consideration of weather, wind, light, sound, heat and cold, pollution and recycling.
Ergonomics and anthropometrics	The interaction between people and the products they use; human size and its influence on designing; the application of anthropometric data to solve practical problems in the made world.
Aesthetics	Shape, form, line, symmetry, proportion, balance, sensory factors, taste, smell and touch.
Consumer law	In so far as laws impact upon the design of products and innovation; basic understanding of the terms 'copyright', 'registered design', 'patents' and 'trademarks' as they apply to the design of products; understanding that legislation exists to provide consumers with protection, e.g. labelling, product literature.
Globalisation of design and manufacturing	The social, moral and technological impact of the globalisation of design and manufacturing on manufacturers and consumers.
Sustainable technologies	The basic principles of sustainable technology, reuseable, recyclable, carbon reduced and carbon neutral products, e.g. sustainable forests, rechargeable batteries, renewable energy supplies, natural oils from plants as an alternative to fossil fuels.
Sustainable design imperatives and design tools	Designing products in a way that reduces environmental impact by the use of renewable resources; the use of sustainable design tools such as life-cycle assessment and life-cycle energy analysis to judge the environmental impact or 'greenness' of various design choices.
Economics of manufacturing	Understanding the principle of the different scales of production, e.g. one-off and batch; recognising the benefits of economies of scale when applied to common manufacturing processes; recognising the importance of sustainable manufacturing and the impact that manufacturing has on the environment.

Marketing and advertising	Understanding how research is used by companies to identify target markets for their products, e.g. ranking and rating tests, consumer surveys; knowing that advertising is part of a marketing strategy.
Computer-aided design and manufacturing	The advantages of CAD/CAM systems to manufacturers and consumers; understanding of common computer-aided manufacturing devices, e.g. laser cutters, printers.
Colour theory	A working understanding of the importance of colour; colour in terms of perception and psychology, colour wheel, complementary colours and contrast.
Systems and structures	Natural and mechanical structures; simple mechanical and electrical systems.
Energy	Sources of energy including both renewable and non-renewable sources; energy from food; energy generated by burning fuel; batteries; impact of energy use on the environment; new forms of sustainable energy sources, e.g. biofuel, hybrid technology.
Scientific principles	The importance of scientific principles in common products such as levers, and mechanisms on bicycles; the reduction of friction through the aerodynamic design of cars; understanding how modern scientific principles and new materials have influenced the design of products.
Health and safety	How products are designed to ensure consumers' health and safety; the role of the British Standards Institute and the Food Standards Agency in quality-assuring products; ways of preventing injury to users on common products, e.g. the use of lead-free and non-toxic paint on children's toys, the avoidance of finger traps, guards on electrical tools, the lion stamp on eggs.
Design potential and impact of new and emerging technologies	Recognising that new materials and technologies create design opportunities, e.g. smart materials used in medical procedures, such as nano technology, microencapsulated dressings; the use of new techniques in food, e.g. ultralow blanching that increases the firmness of canned vegetables and maintains their shelf-life; in graphics, the use of biodegradable and recyclable materials, smart pigments and luminescent inks and new materials, e.g. super-elastic spectacles.

Designing Influences Section B

Candidates should recognise the influences on design of iconic products, trends and trend setters, and of significant technological developments, from the following range of eras and movements: Victorian (1840-1900), Art Nouveau (1890–1914), Art Deco (1920s–1930s), War and Post War years (1940s-50s), the 1960s, 1970s 1980s and the 1990s – to the present.

For each examination cycle there will be a published list of iconic products, trends and trend setters drawn from the range of eras and movements specified above. Candidates will be required to 'discuss' the merits, contribution, significance, etc of these influential trends and developments in Design and Technology.

The examination paper is designed to allow candidates to answer questions from the perspective of any of the five focus areas listed in the table below. Teachers therefore need ONLY prepare their candidates to answer questions from the perspective of the focus area linked to candidates' experiences during the course.

Centres will receive their published list on eras and movements, trend setters and iconic products in September to prepare their candidates for the following June examination.

3 Assessment of GCSE Design and Technology: Product Design

3.1 GCSE Design and Technology: Product Design (J305)

GCSE Design and Technology: Product Design	
Unit A551: *Developing and Applying Design Skills*	
30% of the total GCSE full-course marks 60% of the total GCSE short-course marks 20 hours controlled assessment 90 marks	This unit requires the candidate, working within a context set by a client, the candidate or centre, to produce a design portfolio. The context can be linked to a candidate's own interests, current trends, a particular design era or designer, industrial practice or the community. Projects may involve an enterprise activity, where candidates identify an opportunity and design to meet a particular need.
	The evidence required to be submitted for this unit must be in the form of a portfolio. The portfolio must demonstrate capabilities in a wide range of design skills and must include the use of ICT. The minimum requirement is for ICT to be used for one aspect within this unit. It is, however, anticipated that significantly more emphasis will be placed on the use of ICT throughout this unit.
	Portfolio evidence can be submitted on paper or CD. All electronic evidence must be presented in a format which matches that published in this specification. The whole activity must not exceed 20 hours of work.
	Candidates must select a theme from those set by OCR (see Appendix B2). This theme can, however, be contextualised in order to suit centre-specific circumstances. Tasks (concise worksheets and modelling) will be conducted under informal teacher supervision within tight guidelines specified by OCR (see Section 3.3). In addition to the 20 hours, there should also be further teaching time to increase depth of knowledge and understanding before starting this task.
This unit is internally marked and externally moderated. Work is submitted through the OCR Repository or by post. Assessment will be against the Internal Assessment Objectives 1, 2 and 3 (see Appendix 3.3).	

Unit A552: *Designing and Making Innovation Challenge*	
20% of the total GCSE full-course marks 40% of the total GCSE short-course marks 6 hours plus 30 mins reflection time 60 marks	A 6 hour examination, set by OCR, undertaken in two 3-hour sessions, normally on consecutive days. This examination can be undertaken at a time convenient to the centre during the examination series. The examination will assess the candidate's ability to be innovative, demonstrate flair, work with materials and apply knowledge gained throughout the course.
This unit is externally examined.	

Unit A553: *Making, Testing and Marketing Products*	
30% of the total GCSE marks 20 hours controlled assessment 90 marks	This unit requires the candidate either to develop further the work undertaken in either Unit A551 or Unit A552, or to develop an existing product or new product of the candidate's choosing.
	Candidates produce: • a 3D artefact in the form of a prototype product that can be evaluated • a production log fully detailing the manufacture of the prototype product • details of testing by a user/users against the specification • suggested modifications/improvements to the prototype product • consideration of quantity production • a marketing presentation.
	The marketing presentation – 'sales pitch' – should be the candidate's explanation and production of an interesting way of bringing the product to the attention of one of the following: • a prospective manufacturer • a supplier • a company buyer • a retailer • an end user / user group • a consumer.
	The marketing presentation can be submitted on paper or CD. All electronic evidence must be presented in a format which matches that published in this specification.
This unit is externally examined.	

	This unit is internally marked and externally moderated. Work is submitted through the OCR Repository or by post.
	If candidates work in groups, each candidate must take responsibility for a uniquely definable aspect of the overall 3D model or prototype product. Each candidate must provide unique evidence for assessment against the internal assessment objectives, with additional evidence to indicate the performance of the candidate's design within the context of the performance of the overall project.
	Candidates must select a theme from those set by OCR (see Appendix B2). This theme can, however, be contextualised in order to best suit centre-specific circumstances. Tasks (concise worksheets and modelling) will be conducted under informal teacher supervision within tight guidelines specified by OCR (see Section 4). In addition to the 20 hours, there should also be further teaching time to increase depth of knowledge and understanding before starting this task.
Assessment will be against the Internal Assessment Objectives 4 and 5 (see Appendix 3.3).	

Unit A554: *Designing Influences*	
20% of the total GCSE marks 1 hour 30 mins written paper 60 marks	This unit will test candidates' knowledge and understanding of the factors listed in Section 2.4, Section A and Section B that influence designing. The questions have no material bias.
	The examination paper contains five compulsory questions and is divided into two sections: A and B. Section A addresses the content contained in Section 2.4 of the specification. Section B addresses the content contained in Section 2.4 and will focus upon iconic products, trends and trend setters from a range of eras and design movements.
	In preparation for the examination, details of iconic products, trend setters and eras/movements will be made available to centres.
	The questions in both sections are knowledge- and application-based and require students to demonstrate their understanding through the use of single words, short sentences, annotated sketches and diagrams.
This unit is externally examined.	

3.2 GCSE (Short Course) in Design and Technology: Product Design (J045)

Candidates taking the GCSE (Short Course) in Design and Technology: Product Design (J045) will need to be entered for Units A551 and A552. The scheme of assessment for these units is contained within section 3.1.

3.3 Assessment Objectives (AOs)

Candidates are expected to demonstrate their ability to:

AO1	Recall, select and communicate their knowledge and understanding of design and technology including its wider effects
AO2	Apply knowledge, understanding and skills in a variety of contexts and in designing and making products
AO3	Analyse and evaluate products, including their design and production

3.3.1 AO weightings – GCSE Design and Technology: Product Design

Unit	% of GCSE			Total
	AO1	AO2	AO3	
Unit A551: Developing and Applying Design Skills	7	18	5	30
Unit A552: Designing and Making Innovation Challenge	6	9	5	20
Unit A553: Making, Testing and Marketing Products	5	21	4	30
Unit A554: Designing Influences	8	6	6	20
Total	26	54	20	100

3.3.2 AO weightings – GCSE (Short Course) GCSE Design and Technology: Product Design

The relationship between the units and the assessment objectives of the scheme of assessment is shown in the following grid:

Unit	% of GCSE			Total
	AO1	AO2	AO3	
Unit A551: Developing and Applying Design Skills	14	36	10	60
Unit A552: Designing and Making Innovation Challenge	12	18	10	40
Total	26	54	20	100

3.4 Grading and awarding grades

GCSE results are awarded on the scale A* to G. Units are awarded a* to g. Grades are indicated on certificates. However, results for candidates who fail to achieve the minimum grade (G or g) will be recorded as *unclassified* (U or u) and this is **not** certificated.

Most GCSEs are unitised schemes. When working out candidates' overall grades OCR needs to be able to compare performance on the same unit in different series when different grade boundaries may have been set, and between different units. OCR uses a Uniform Mark Scale to enable this to be done.

A candidate's uniform mark for each unit is calculated from the candidate's raw mark on that unit. The raw mark boundary marks are converted to the equivalent uniform mark boundary. Marks between grade boundaries are converted on a pro rata basis.

When unit results are issued, the candidate's unit grade and uniform mark are given. The uniform mark is shown out of the maximum uniform mark for the unit, e.g. 120/80.

These specifications are graded on a Uniform Mark Scale. The uniform mark thresholds for each of the assessments are shown below:

(GCSE) Unit Weighting	Maximum Unit Uniform Mark	Unit Grade								
		a*	a	b	c	d	e	f	g	u
30%/60%	120	108	96	84	72	60	48	36	24	0
20%/40%	80	72	64	56	48	40	32	24	16	0

A candidate's uniform marks for each unit are aggregated and grades for these specifications are generated on the following scale:

Qualification	Maximum Uniform Mark	Qualification Grade								
		A*	A	B	C	D	E	F	G	U
GCSE	400	360	320	280	240	200	160	120	80	0
Short Course	200	180	160	140	120	100	80	60	40	0

For the Short Course the written paper will have a total weighting of 40% and controlled assessment a weighting of 60%. For the GCSE the written papers will have a total weighting of 20% and controlled assessment a weighting of 30%.

A candidate's uniform mark for each paper will be combined with the uniform marks for the controlled assessments to give a total uniform mark for the specification. The candidate's grade will be determined by the total uniform mark.

3.5 Grade descriptions

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

The grade descriptors have been produced by the regulatory authorities in collaboration with the awarding bodies.

3.5.1 Grade F

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

They apply limited knowledge, understanding and skills to plan and carry out simple investigations and tasks, with an awareness of the need for safety and precision. They modify their approach in the light of progress.

They review their evidence and draw basic conclusions.

3.5.2 Grade C

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

They apply knowledge, understanding and skills in a range of situations to plan and carry out investigations and tasks. They test their solutions, working safely and with precision.

They review the evidence available, analysing and evaluating some information clearly, and with some accuracy. They make judgements and draw appropriate conclusions.

3.5.3 Grade A

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

They apply relevant knowledge, understanding and skills in a range of situations to plan and carry out investigations and tasks effectively. They test their solutions, working safely and with a high degree of precision.

They analyse and evaluate the evidence available, reviewing and adapting their methods when necessary. They present information clearly and accurately, making reasoned judgements and presenting substantiated conclusions.

3.6 Quality of written communication

Quality of written communication is assessed in Unit A552 and Unit A554 and is integrated in the marking criteria.

Candidates are expected to:

- ensure that text is legible and that spelling, punctuation and grammar are accurate so that meaning is clear
- present information in a form that suits its purpose
- use an appropriate style of writing and, where applicable, specialist terminology.

Controlled assessment in GCSE Design and Technology: Product Design

4

This section provides general guidance on controlled assessment: what controlled assessment tasks are, when and how they are available; how to plan and manage controlled assessment and what controls must be applied throughout the process. More support can be found on the OCR website.

Teaching and Learning

Activities which develop skills take place regularly in the classroom, using a variety of appropriate resources (as chosen by the teacher). These opportunities allow candidates to practise a wide range of tasks, and teachers can discuss and comment on performance as appropriate. There are no restrictions regarding time or feedback to individual learners. When all necessary teaching and learning has taken place and teachers feel that candidates are ready for assessment, candidates can be given the controlled assessment task. Controlled assessment is designed to be an integral part of teaching and learning.

4.1 Controlled assessment tasks

Units A551 and A553 have been designed to be internally assessed, applying the principles of controlled assessment. Controls are set within the assessments so that validity and reliability are ensured and the assessors can confidently authenticate the candidates' work. These controls take a variety of forms in each of the stages of the assessment process: task setting, task taking and task marking. Within each of these three stages there are different levels of control. This section sets out the overall OCR approach, but the assessment sections of the units include more detail and any specific requirements.

Centres can choose one from a number of theme-based tasks offered by OCR (see Appendix B). These tasks can be used with a minimum amount of adaptation or they can be adapted so that they allow the usage of local resources available to any centre. These tasks may also be set within overarching scenarios and briefs more relevant to centres' own environment and targeted at their particular cohorts of candidates.

Controlled assessment tasks may be adapted by centres in ways which will not put at risk the opportunity for candidates to meet the Assessment Criteria, including the chance to gain marks at the highest level. For some units this may allow for little to be adapted other than minor cosmetic details, e.g. the description and nature of the product on which a task is based. For other units the medium in which the candidates are working may be a matter of choice. Each controlled assessment task will include a section which briefly specifies the type and degree of adaptation which is appropriate.

The same OCR controlled assessment task must NOT be used as the practice material and then as the actual live assessment material. Centres should devise their own practice material using the OCR specimen controlled assessment task as guidance.

4.2 Planning and managing controlled assessment

Controlled assessment tasks are available at an early stage to allow planning time. It is anticipated that candidates will spend a total of about 20 hours in producing the work for units A551 and A553. Candidates should be allowed sufficient time to complete the tasks.

4.2.1 Preparation and research time

Preparation (informal supervision)

Informal supervision ensures that the work of the individual candidates is recorded accurately and that plagiarism does not take place. Assessable outcomes may be informed by group work, but must be an individual response.

- introduction to the task (teacher led)

Includes choice of tasks, possible approaches and sources of evidence, time allocations, programmes of work and deadlines, methods of working, control requirements.

Research (limited supervision)

Limited supervision means that candidates can undertake this part of the process without direct teacher supervision and outside the centre as required. Candidates are also able to work in collaboration during this stage. However, when producing their final piece of work, candidates must complete and/or evidence all work individually.

- research/collection of evidence

During the research phase candidates can be given support and guidance.

Teachers **can**:

- explain the task
- advise on how the task could be approached
- advise on resources
- alert the candidate to key things that must be included in the final piece of work.

Teachers **must not**:

- comment on or correct the work
- practise the task with the candidates
- provide templates, model answers or feedback on drafts.

Research material can include fieldwork, internet or paper-based research, questionnaires, audio and video files etc. Candidates must be guided on the use of information from other sources to ensure that confidentiality and intellectual property rights are maintained at all times. It is essential that any material directly used from a source is appropriately and rigorously referenced.

4.2.2 Producing the final piece of work

Producing the final piece of work (formal supervision)

Formal supervision means under direct teacher supervision: teachers must be able to authenticate the work and there must be acknowledgement and referencing of any sources used. If writing up is carried out over several sessions, work must be collected in between sessions.

The final piece of work should be indexed and include headings that identify materials presented by the candidate. Footnotes, figures, tables, diagrams, charts and appendices should be included where appropriate.

When supervising tasks, teachers are expected to:

- exercise continuing supervision of work in order to monitor progress and to prevent plagiarism
- exercise continuing supervision of practical work to ensure essential compliance with Health and Safety requirements
- ensure that the work is completed in accordance with the specifications' requirements and can be assessed in accordance with the specified marking criteria and procedures.

Candidates must work independently to produce their own final piece of work.

Candidates should be allowed sufficient time to complete all of the tasks. It is suggested that evidence is produced in several sessions, each focusing on a specific task within the overall task or scenario. These may be interspersed with opportunities to learn knowledge and develop appropriate practical skills.

Each candidate must produce individual and authentic evidence for each of the tasks. It is particularly important that candidates working in groups, where the unit allows this, should still produce individual evidence of their contribution to ongoing group work and any final realisation or outcome.

Centre staff may give support and guidance to candidates. This support and guidance should focus on checking that candidates understand what is expected of them and that they work safely. Candidates will also need support and guidance when accessing materials provided by the centre.

Candidates may use information from any relevant source to help them with producing evidence for the tasks.

In general, candidates must be guided on the use of information from other sources to ensure that confidentiality and intellectual property rights are maintained at all times. It is essential that any material directly used from a source is appropriately and rigorously referenced. Where a dataset or case material is provided, it is acknowledged that candidates in their responses will refer to situations in the assessment material but as this is fictitious this does not break any rules of confidentiality or copyright.

4.2.3 Presentation of the final piece of work

Candidates must observe the following procedures when producing their final piece of work for the controlled assessment tasks.

- Tables, graphs and spreadsheets may be produced using appropriate ICT. These should be inserted into the report at the appropriate place.
- Any copied material must be suitably acknowledged.
- Quotations must be clearly marked and a reference provided wherever possible.
- Work submitted for moderation or marking must be clearly identified with the:
  - centre number
  - centre name
  - candidate number
  - candidate name
  - unit code and title
  - task title.

Work submitted on paper for moderation must be secured either in a notebook, portfolio case or by treasury tags. Work submitted in digital format (CD or online) must be in a suitable file structure with each file clearly named with the unit code, centre number and candidate number (as detailed in Appendix A).

4.3 Marking and moderating controlled assessment

All controlled assessment units are marked by the centre assessor(s) using OCR marking criteria and guidance and are moderated by the OCR-appointed moderator. External moderation is either e-moderation where evidence in a digital format is supplied or postal moderation.

For GCSE in Design and Technology: Product Design, OCR will assume a medium level of control in relation to the marking of tasks. All controlled assessed units will be marked by the centre assessor(s) using awarding body marking criteria and guidance, and moderated by the OCR appointed moderator. For this GCSE, external moderation will take the form of postal moderation or e-moderation where digital evidence is uploaded to the OCR Repository.

4.3.1 Applying the marking criteria

The starting point for marking the tasks is the marking criteria within each unit (see section 4.3.4 *Marking criteria for controlled assessment tasks* below). These contain levels of criteria for the skills, knowledge and understanding that the candidate is required to demonstrate. Before the start of the course, and for use at INSET training events, OCR will provide exemplification through real or simulated candidate work which will help to clarify the level of achievement the assessors will be looking for.

4.3.2 Use of 'best fit' approach to marking criteria

The assessment task(s) for each unit should be marked by teachers according to the given marking criteria within the relevant unit using a 'best fit' approach. For each of the assessment criteria, teachers select the most appropriate band descriptors provided in the marking grid that describes the quality of the work being marked.

Marking should be positive, rewarding achievement rather than penalising failure or omissions. The award of marks **must be** directly related to the marking criteria.

Teachers use their professional judgement in selecting the descriptor that best describes the work of the candidate.

To select the most appropriate mark within the descriptor, teachers should use the following guidance:

- where the candidate's work *convincingly* meets the statement, the highest mark should be awarded
- where the candidate's work *adequately* meets the statement, the most appropriate mark in the middle range should be awarded
- where the candidate's work *just* meets the statement, the lowest mark should be awarded.

Centres should use the full range of marks available to them; centres must award *full* marks in any band for work which fully meets that descriptor. This is work which is 'the best one could expect from candidates working at that level'. Where there are only two marks within a band, the choice will be between work which, in most respects, meets the statement and work which just meets the statement. For wider mark bands, the marks on either side of the middle mark(s) for 'adequately met' should be used where the standard is lower or higher than 'adequate' but **not** the highest or lowest mark in the band.

For example, when marking Internal Assessment Objective 4: Prototype manufacture

Statements from each of the level of response boxes	**Reasons for allotting particular marks**
Production log shows a good range of skills; use of materials, tools and equipment explained clarity; modifications and problem solving during making recorded	Mark range 9–12 The candidate's work *convincingly* meets the statement, the highest mark should be awarded (12)
Work shows little economic use of materials or consideration of sustainability; no clear understanding of safe working practices; no indication of how to achieve precision	Mark range 1–3 The candidate's work *just* meets the statement, the lowest mark should be awarded (1)
The product will exhibit a good standard of outcome, will be complete and will function as intended.	Mark range 11–17 The candidate's work *adequately* meets the statement, the most appropriate mark in the middle range should be awarded (14)
Total mark for Objective 4	**27**

The final mark for the candidate for the controlled assessment unit is out of a total of 90 and is found by totalling the marks for each of the marking objective/criteria strands.

There should be clear evidence that work has been attempted and some work produced. If a candidate submits no work for the internally assessed units, then the candidate should be indicated as being absent from that unit. If a candidate completes any work at all for an internally assessed unit, then the work should be assessed according to the marking criteria and the appropriate mark awarded, which may be zero.

4.3.3 Annotation of candidates' work

Each piece of internally assessed work should show how the marks have been awarded in relation to the marking criteria.

The writing of comments on candidates' work, and coversheet, provides a means of communication between teachers during the internal standardisation and with the moderator if the work forms part of the moderation sample.

4.3.4 Marking criteria for controlled assessment tasks

These specifications require 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 GCSE assessment objectives of: materials, components, processes, techniques and industrial practice (AO1) for designing and making quality products (AO2) and for evaluating processes and products and examining the wider effects of design and technology on society (AO3) are assessed through the 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
2	Research into design brief resulting in a specification for the design of a product	5	13	5
3	Generation of design proposals	10	41	10
	Unit A551 total marks (90)	**17**	**56**	**17**
4	Prototype manufacture	7	40	8
5	Testing and marketing	7	20	8
	Unit A553 total marks (90)	**14**	**60**	**16**

0 marks = no response or no response worthy of credit

Unit A551 is assessed against Internal Assessment Objectives 1, 2 and 3. Unit A553 is assessed against Internal Assessment Objectives 4 and 5. The weighting of the marks provides an indicator of the time that candidates should spend on each part of the project.

Applying the internal assessment objectives to candidates' work:

- each internal assessment objective has one or more 'level of response' boxes, which in turn contain four hierarchical statements
- the marks have been broken down into ranges of marks for the hierarchical statements within each level of response box.

Internal Assessment Objective 1 **TOTAL MARKS 6**

0 marks = no response or no response worthy of credit

Identification of a need or opportunity leading to a design brief	Level of response	Mark range
Candidates will need to: • provide a detailed description of the design need using various means of communication • extract from verbal, visual and statistical information the essential problems to be solved • identify the range of users and the market for which the product is intended • develop a design brief for a marketable product which is innovative and might involve some degree of risk taking.	Detailed evidence of both the design need and intended user/ users leading to an appropriate and comprehensive design brief for the product	5–6
	Evidence of both the design need and the intended user/users leading to an appropriate design brief for the product	3–4
	Some details of the design need or the intended user/users leading to a design brief for the product	2
	A statement of the design need	1
	Maximum mark	**6**

Internal Assessment Objective 2 **TOTAL MARKS 23**

0 marks = no response or no response worthy of credit

Research into design brief resulting in a specification for the design of a product	Level of response	Mark range
Candidates will need to: • identify and collect other data relevant to the product and its users • examine the intended purpose of existing products • identify opportunities for developing new and innovative products to improve upon the weaknesses of existing products	Detailed and comprehensive examination of other similar products; detailed analysis of other relevant research	7–8
	Adequate examination of other similar products; other relevant research	5–6
	Examination of other similar products	3–4
	Cursory examination of other similar products	1–2
• identify and collect relevant data about the user(s) • examine the intended purpose of the intended product	Intended user(s) of product examined with significant data identified and collected; other key data identified and collected	6–7
	Intended user(s) of product examined with adequate data identified and collected; other data identified and collected	4–5
• understand the issues that expand the design brief	Intended user(s) of product examined with some data identified or collected	2–3
• detail the requirements of the product	Limited research of intended user(s)	1
• demonstrate an ability to express the results of research and analysis in the form of a suitably detailed and justified specification	A detailed and justified specification identifying most of the key features which considers the user	7–8
	Specification identifying most of the key features and considers the user	5–6
	Specification identifying some key features	3–4
	Specification identifying some basic requirements	1–2
	Maximum mark	**23**

Internal Assessment Objective 3

0 marks = no response or no response worthy of credit **TOTAL MARKS 61**

Generation of design proposals	Level of response	Mark range
Candidates will need to: • generate and record the development of design proposals that are innovative and show flair and imagination • consider user needs and issues when developing ideas • consider aesthetics, ergonomics, function and the other design influences • appraise design ideas for suitability, value and consequence • identify, with reasons for selection/rejection, the chosen design proposal(s) for prototype manufacture • use suitable communication techniques, including graphics and ICT, to develop and model design proposals and production systems • use modelling to check on the feasibility of design ideas Candidates may also: • check that the design proposal meets legislative standards; consider patents and copyrights • control the development of the product for manufacture and identify within the design proposals the resources needed for the prototype to be realised • consider, using examples, those aspects of the design which could most easily be manufactured in quantity • produce a final product specification.	A range of detailed ideas leading to the development of a comprehensive solution showing innovation and/or some risk taking	20–25
	A range of detailed ideas leading to the development of a solution showing some innovation	14–19
	Several solutions proposed showing some detail but with limited innovation	6–13
	One or more solutions proposed	1–5
	Appropriate consideration given to the user, aesthetics, ergonomics, function, sustainability and/or the other design influences with few errors in spelling, punctuation and grammar	7–8
	Consideration given to the user, aesthetics, ergonomics, function, sustainability and/or the other design influences with few errors in spelling, punctuation and grammar	5–6
	Some consideration given to the user, aesthetics, ergonomics, function, sustainability or the other design influences with some errors in spelling, punctuation and grammar	3–4
	Limited consideration given to the user, aesthetics, ergonomics, function, sustainability or the other design influences, with noticeable errors in spelling punctuation and grammar	1–2
	Design proposal chosen from detailed and relevant evaluation against the specification and product standards	8–10
	Design proposal chosen supported by relevant evaluation against the specification and product standards	6–7
	Limited evaluation of designs against specification and product standards, some of which is relevant	4–5
	Limited evaluation of designs against specification and product standards	1–3
	Graphical, written and modelling communicates effectively and with precision, is of a high standard and structure, and uses a wide range of appropriate techniques	7–8
	Graphical, written and modelling communicates effectively, is of a good standard and structure, and uses a number of appropriate techniques	5–6
	Graphical, written and modelling communication will be of an adequate standard and structure, but using a limited range of techniques	3–4
	Graphical, written and modelling communication will be of a limited standard and structure, using a limited range of techniques	1–2
	Comprehensive use of ICT includes work which demonstrates the use of appropriate CAD or other computer applications as an integrated part of the designing activity	8–10
	Appropriate use of ICT includes good use of CAD or other computer applications as part of the designing activity	6–7
	Basic use of ICT, includes basic CAD or other computer applications	3–5
	Limited use of ICT eg word or data processing or simple drawing	1–2
	Maximum mark	**61**

Internal Assessment Objective 4

0 marks = no response or no response worthy of credit **TOTAL MARKS 55**

Prototype manufacture	Level of response Production log will contain images and explanation of the processes undertaken to complete the prototype, plus a range of digital images/ photographs showing the quality and functions of the completed product. These must be available for moderation for any marks to be awarded for this objective.	Mark range
Candidates will need to: • make a 3D prototype using appropriate media; the prototype to have working features to demonstrate how the product will function • complete a production log of the stages of making the product • select and use the appropriate tools, equipment and processes effectively and safely to make products that match the specification • use of tools and techniques to achieve precision • use CAM where appropriate • deploy a range of skills and techniques appropriate to the task, (**CAD/CAM is a single skill**), including those necessary to ensure realism of the prototype product • prepare and use materials economically • select and use appropriate pre-manufactured components • be prepared to adapt working procedures in response to changing circumstances • demonstrate clear understanding of safe working practices	Production log shows a high degree of skills, use of materials, tools and equipment; images are explained with detail and reasoning; justification of modifications and problem solving during making	13–18
	Production log shows a good range of skills; use of materials, tools and equipment explained clearly; modifications and problem solving during making recorded	9–12
	Production log shows a adequate range of skills, use of materials, tools and equipment	5–8
	Production log shows a limited range of skills, use of materials, tools and equipment	1–4
	Shows careful selection and economic use of materials and consideration of sustainability; high understanding of safe working practices; detailed understanding of how to achieve precision	10–12
	Materials have been used economically, with some consideration of sustainability; good understanding of safe working practices; understanding of how to achieve precision	7–9
	Work shows some economic use of materials or some consideration of sustainability; reasonable understanding of safe working practices; limited indication of how to achieve precision	4–6
	Work shows limited economic use of materials or consideration of sustainability; limited understanding of safe working practices	1–3
	The product is complete and functions effectively as intended, is of a high standard and comprehensively meets the requirements of the design specification	18–25
	The product is mostly complete and functions, is of a good standard and mostly meets the requirements of the design specification	11–17
	The product functions and is to a reasonable standard, and satisfies the specification with some degree of success	5–10
	The product is basic and mostly functional; meeting the requirements of the specification is limited	1–4
	Maximum mark	**55**

Internal Assessment Objective 5

0 marks = no response or no response worthy of credit **TOTAL MARKS 35**

Testing, evaluating and marketing products	Level of response A marketing presentation must be available for moderation for any marks to be awarded for this objective.	Mark range
Candidates will need to provide: • a design concept page that includes details of the prototype product to be made and a related detailed specification	Evidence of thorough testing by a user/user group and full evaluation with reference to the design specification using written techniques of a high standard and structure, with few errors in spelling, punctuation and grammar	6–7
	Evidence of testing by a user/user group and evaluation with reference to the design specification, using written techniques of a good standard and structure, with few errors in spelling, punctuation and grammar	4–5
• evidence of testing and evaluation of the prototype product by a user/user group against the design criteria	Evidence of evaluation with some reference to the design specification and a user/user group, using written techniques of a adequate standard and structure, with errors in spelling, punctuation and grammar	3
	Superficial evidence of user-group testing and evaluation with no reference to the design specification, limited use of written techniques, with noticeable errors in spelling, punctuation and grammar	1–2
• evidence of user/user-group feedback of the prototype product	Design modifications/improvements of the final product are suggested in comprehensive detail	5
	Design modifications/improvements of the final product are suggested with adequate detail	4
• details of any review processes and necessary modifications to improve the final prototype product	Design modifications/improvements of the final product are suggested with limited detail	2–3
	Design modifications/improvements of the final product are suggested with few details	1
• details of how the design prototype could be manufactured in quantity by either batch, repetitive flow, continual flow or other production system in the 'real world'	Consideration of quantity production leading to a detailed description of a suitable quantity manufacturing system including details of chosen materials for the main component(s)	5
	Consideration of quantity production leading to a detailed description of a suitable quantity manufacturing system for the product prototype	4
	Consideration of quantity production leading to limited but clear details of a suitable quantity manufacturing system for the prototype product	2–3
	Consideration of quantity production leading to a statement identifying a suitable quantity manufacturing system for the prototype product	1
• marketing presentation – 'sales pitch' – in an interesting way to bring the product to the attention of one of the following: • a prospective manufacturer • a supplier • a company buyer • a retailer • an end user/user group • a consumer	Marketing presentation is thorough and comprehensive and uses an innovative and persuasive approach	13–18
	Marketing presentation is detailed, and uses a persuasive approach	8–12
	Marketing presentation is adequate and highlights key points	4–7
	Marketing presentation addresses some key points	1–3
	Maximum mark	**35**

4.3.5 Authentication of work

Teachers must be confident that the work they mark is the candidate's own. This does not mean that a candidate must be supervised throughout the completion of all work but the teacher must exercise sufficient supervision, or introduce sufficient checks, to be in a position to judge the authenticity of the candidate's work.

Wherever possible, the teacher should discuss work-in-progress with candidates. This will not only ensure that work is underway in a planned and timely manner but will also provide opportunities for assessors to check authenticity of the work and provide general feedback.

Candidates must not plagiarise. Plagiarism is the submission of another's work as one's own and/or failure to acknowledge the source correctly. Plagiarism is considered to be malpractice and could lead to the candidate being disqualified. Plagiarism sometimes occurs innocently when candidates are unaware of the need to reference or acknowledge their sources. It is therefore important that centres ensure that candidates understand that the work they submit must be their own and that they understand the meaning of plagiarism and what penalties may be applied. Candidates may refer to research, quotations or evidence but they must list their sources. The rewards from acknowledging sources, and the credit they will gain from doing so, should be emphasised to candidates as well as the potential risks of failing to acknowledge such material. Candidates may be asked to sign a declaration to this effect. Centres should reinforce this message to ensure candidates understand what is expected of them.

Please note: Centres must confirm to OCR that the evidence produced by candidates is authentic. The Centre Authentication Form includes a declaration for assessors to sign and is available from the OCR website and OCR Interchange.

4.3.6 Internal standardisation

It is important that all internal assessors, working in the same subject area, work to common standards. Centres must ensure that the internal standardisation of marks across assessors and teaching groups takes place using an appropriate procedure.

This can be done in a number of ways. In the first year, reference material and OCR training meetings will provide a basis for centres' own standardisation. In subsequent years, this, or centres' own archive material, may be used. Centres are advised to hold preliminary meetings of staff involved to compare standards through cross-marking a small sample of work. After most marking has been completed, a further meeting at which work is exchanged and discussed will enable final adjustments to be made.

4.3.7 Moderation

All work for controlled assessment is marked by the teacher and internally standardised by the centre. Marks are then submitted to OCR, after which moderation takes place in accordance with OCR procedures: refer to the OCR website for submission dates of the marks to OCR. The purpose of moderation is to ensure that the standard of the award of marks for 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 marking criteria defined in Section 4.3.4 page 28.

Each candidate's work should have a cover sheet attached to it with a summary of the marks awarded for the task. If the work is to be submitted in digital format, this cover sheet should also be submitted electronically within each candidate's files.

4.4 Submitting the moderation samples via the OCR Repository

The OCR Repository is a secure website for centres to upload candidate work and for assessors to access this work digitally. Centres can use the OCR Repository for uploading marked candidate work for moderation.

Centres can access the OCR Repository via OCR Interchange, find their candidate entries in their area of the Repository, and use the Repository to upload files (singly or in bulk) for access by their moderator.

The OCR Repository allows candidates to send evidence in electronic file types that would normally be difficult to submit through postal moderation; for example multimedia or other interactive unit submissions.

The OCR GCSE Product Design unit(s) A551/A553 can be submitted electronically to the OCR Repository via Interchange.

There are three ways to load files to the OCR Repository:

1 Centres can load multiple files against multiple candidates by clicking on 'Upload candidate files' in the Candidates tab of the Candidate Overview screen.

2 Centres can load multiple files against a specific candidate by clicking on 'Upload files' in the Candidate Details screen.

3 Centres can load multiple administration files by clicking on 'Upload admin files' in the Administration tab of the Candidate Overview screen.

The OCR Repository is seen as a faster, greener and more convenient means of providing work for assessment. It is part of a wider programme bringing digital technology to the assessment process, the aim of which is to provide simpler and easier administration for centres.

Instructions for how to upload files to OCR using the OCR Repository can be found on OCR Interchange.

5 Support for GCSE Design and Technology: Product Design

5.1 Free resources available from the OCR website

The following materials will be available on the OCR website:

- GCSE Design and Technology: Product Design Specification
- Sample schemes of work: A551 A552 A553 A554
- Guide to controlled assessment
- Teachers Handbook

5.2 Other resources

OCR offers centres a wealth of high quality published support with a choice of 'Official Publisher Partner' and 'Approved Publication' resources, all endorsed by OCR for use with OCR specifications.

5.2.1 Publisher partners

OCR works in close collaboration with publisher partners to ensure you have access to:

- published support materials available when you need them, tailored to OCR specifications
- high quality resources produced in consultation with OCR subject teams, which are linked to OCR's teacher support materials.

Hodder Education is the publisher partner for OCR GCSE Design and Technology: Product Design

5.2.2 Endorsed publications

OCR endorses a range of publisher materials to provide quality support for centres delivering its qualifications. You can be confident that materials branded with OCR's 'Official Publishing Partner' or 'Approved publication' logos have undergone a thorough quality assurance process to achieve endorsement. All responsibility for the content of the publisher's materials rests with the publisher.

These endorsements do not mean that the materials are the only suitable resources available or necessary to achieve an OCR qualification.

5.3 Training

OCR will offer a range of support activities for all practitioners throughout the lifetime of the qualification to ensure they have the relevant knowledge and skills to deliver the qualification.

Please see Event Booker for further information.

5.4 Training

5.4.1 Active Results

Active Results is available to all centres offering OCR's GCSE Design and Technology: Product Design specifications.

Active Results is a free results analysis service to help teachers review the performance of individual candidates or whole schools.

Data can be analysed using filters on several categories such as gender and other demographic information, as well as providing breakdowns of results by question and topic.

Active Results allows centres to look in greater detail at their results:

- richer and more granular data will be made available to centres including question level data available from e-marking
- centres can identify the strengths and weaknesses of individual candidates and their centre's cohort as a whole
- OCR systems have been developed in close consultation with teachers so that the technology delivers what centres need.

Further information on Active Results can be found on the OCR website.

5.4.2 OCR Interchange

OCR Interchange has been developed to help centres to carry out day-to-day administration functions online, quickly and easily. The site allows centres to register and enter candidates online. In addition, centres can gain immediate and free access to candidate information at their convenience. Sign up on the OCR website.

6 Equality and Inclusion in GCSE Design and Technology: Product Design

6.1 Equality Act information relating to GCSE Design and Technology: Product Design

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

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

Reasonable adjustments are made for disabled candidates in order to enable them to access the assessments and to demonstrate what they know and can do. For this reason, very few candidates will have a complete barrier to the assessment. Information on reasonable adjustments is found in *Access Arrangements, Reasonable Adjustments and Special Consideration* by the Joint Council www.jcq.org.uk.

Candidates who are unable to access part of the assessment, even after exploring all possibilities through reasonable adjustments, may still be able to receive an award based on the parts of the assessment they have taken.

The access arrangements permissible for use in these specifications are in line with Ofqual's GCSE subject criteria equalities review and are as follows:

	Yes/No	Type of Assessment
Readers	Y	All written and practical assessments
Scribes	Y	All written and practical assessments
Practical assistants	Y	Practical assessments
Word processors	Y	All written and practical assessments
Transcripts	Y	All written and practical assessments
Oral language modifiers	Y	All written and practical assessments
BSL signers	Y	All written and practical assessments
Modified question papers	Y	All written and practical assessments
Extra time	Y	All written examinations

6.2 Arrangements for candidates with particular requirements (including Special Consideration)

All candidates with a demonstrable need may be eligible for access arrangements to enable them to show what they know and can do. The criteria for eligibility for access arrangements can be found in the JCQ document *Access Arrangements, Reasonable Adjustments and Special Consideration*.

Candidates who have been fully prepared for the assessment but who have been affected by adverse circumstances beyond their control at the time of the examination may be eligible for special consideration. As above, centres should consult the JCQ document *Access Arrangements, Reasonable Adjustments and Special Consideration*.

Administration of GCSE Product Design

7

In December 2011 the GCSE qualification criteria were changed by Ofqual. As a result, all GCSE qualifications have been updated to comply with the new regulations.

The most significant change for all GCSE qualifications is that, from 2014, unitised specifications must require that 100% of the assessment is terminal.

Please note that there are no changes to the terminal rule and re-sit rules for the January 2013 and June 2013 examination series:

- at least 40% of the assessment must be taken in the examination series in which the qualification is certificated
- candidates may re-sit each unit once before certification, i.e. each candidate can have two attempts at a unit before certification.

For full information on the assessment availability and rules that apply in the January 2013 and June 2013 examination series, please refer to the previous version of these specifications GCSE Product Design and GCSE (Short Course) Product Design available on the website.

The sections below explain in more detail the rules that apply from the June 2014 examination series onwards.

7.1 Availability of assessment from 2014

There is one examination series available each year in June (all units are available each year in June).

GCSE Product Design certification is available in June 2014 and each June thereafter.

GCSE (Short Course) Product Design certification is available in June 2014 and each June thereafter.

	Unit A551	Unit A552	Unit A553	Unit A554	Certification availability
June 2014	✓	✓	✓	✓	✓
June 2015	✓	✓	✓	✓	✓

7.2 Certification rules

For GCSE Product Design and GCSE (Short Course) Product Design, from June 2014 onwards, a 100% terminal rule applies. Candidates must enter for all their units in the series in which the qualification is certificated.

GCSE Product Design and GCSE (Short Course) Product Design can be certificated concurrently if all units are taken in the same series.

Candidates who have claimed GCSE (Short Course) Product Design and decide to move on to GCSE Product Design will need to re-take all of the GCSE (Short Course) Product Design units alongside the additional units required for GCSE Product Design. The new results for the units that have been re-taken will then be used to calculate the GCSE Product Design grade. Any results previously achieved cannot be re-used.

7.3 Rules for re-taking a qualification

Candidates may enter for the qualification an unlimited number of times.

Where a candidate re-takes a qualification, **all** units must be re-entered and all externally assessed units must be re-taken in the same series as the qualification is re-certificated. The new results for these units will be used to calculate the new qualification grade. Any results previously achieved cannot be re-used.

For each of the controlled assessment units, candidates who are re-taking a qualification can choose either to re-take that controlled assessment unit or to carry forward the result for that unit that was used towards the previous certification of the same qualification.

- Where a candidate decides to re-take the controlled assessment, the new result will be the one used to calculate the new qualification grade. Any results previously achieved cannot be re-used.
- Where a candidate decides to carry forward a result for controlled assessment, they must be entered for the controlled assessment unit in the re-take series using the entry code for the carry forward option (see section 7.4).

7.4 Making entries

7.4.1 Unit entries

Centres must be approved to offer OCR qualifications before they can make any entries, including estimated entries. It is recommended that centres apply to OCR to become an approved centre well in advance of making their first entries. Centres must have made an entry for a unit in order for OCR to supply the appropriate forms and administrative materials.

It is **essential** that correct unit entry codes are used when making unit entries.

For the controlled assessment units, centres can decide whether they want to submit candidates' work for moderation through the OCR Repository or by post. Candidates submitting controlled assessment must be entered for the appropriate unit entry code from the table below. Candidates who are re-taking the qualification and who want to carry forward the controlled assessment should be entered using the unit entry code for the carry forward option.

Centres should note that controlled assessment tasks can still be completed at a time which is appropriate to the centre/candidate. However, where tasks change from year to year, centres would have to ensure that candidates had completed the correct task(s) for the year of entry.

Unit entry code	Component code	Assessment method	Unit titles
A551A	01	Moderated via OCR Repository	*Developing and Applying Design Skills*
A551B	02	Moderated via postal moderation	*Developing and Applying Design Skills*
A551C	80	Carried forward	*Developing and Applying Design Skills*
A552	01	Written paper	*Designing and Making Innovation Challenge*
A553A	01	Moderated via OCR Repository	*Making, Testing and Marketing Products*
A553B	02	Moderated via postal moderation	*Making, Testing and Marketing Products*
A553C	80	Carried forward	*Making, Testing and Marketing Products*
A554	01	Written paper	*Designing Influences*

7.4.2 Certification entries

Candidates must be entered for qualification certification separately from unit assessment(s). If a certification entry is **not** made, no overall grade can be awarded.

Candidates may be entered for one or both of the following:

- GCSE Product Design certification code J305
- GCSE Product Design (Short Course) certification code J045

7.5 Enquiries about results

Under certain circumstances, a centre may wish to query the result issued to one or more candidates. Enquiries about results for GCSE units must be made immediately following the series in which the relevant unit was taken and by the relevant enquiries about results deadline for that series.

Please refer to the JCQ *Post-Results Services* booklet and the OCR *Admin Guide: 14–19 Qualifications* for further guidance on enquiries about results and deadlines. Copies of the latest versions of these documents can be obtained from the OCR website at www.ocr.org.uk.

7.6 Prohibited qualifications and classification code

Every specification is assigned a national classification code indicating the subject area to which it belongs. The classification code for these specifications is 9080.

Centres should be aware that candidates who enter for more than one GCSE qualification with the same classification code will have only one grade (the highest) counted for the purpose of the School and College Performance Tables.

Centres may wish to advise candidates that, if they take two specifications with the same classification code, colleges are very likely to take the view that they have achieved only one of the two GCSEs. The same view may be taken if candidates take two GCSE specifications that have different classification codes but have significant overlap of content. Candidates who have any doubts about their subject combinations should seek advice, either from their centre or from the institution to which they wish to progress.

Other information about GCSE Design and Technology: Product Design

8

8.1 Overlap with other qualifications

There is no significant overlap between the content of these specifications and that for other GCSE qualifications.

8.2 Progression from this qualification

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

Progression to further study from GCSE will depend upon the number and nature of the grades achieved. Broadly, candidates who are awarded mainly Grades D to G at GCSE could either strengthen their base through further study of qualifications at Level 1 within the National Qualifications Framework or could proceed to Level 2. Candidates who are awarded mainly Grades A* to C at GCSE would be well prepared for study at Level 3 within the National Qualifications Framework.

8.3 Avoidance of bias

OCR has taken great care in preparation of these specifications and assessment materials to avoid bias of any kind. Special focus is given to the 9 strands of the Equality Act with the aim of ensuring both direct and indirect discrimination is avoided.

8.4 Regulatory requirements

These specifications comply in all respects with the current: *General Conditions of Recognition; GCSE, GCE, Principal Learning and Project Code of Practice; GCSE controlled assessment regulations* and the *GCSE subject criteria for Design and Technology: Product Design*. All documents are available on the Ofqual website.

8.5 Language

These specifications and associated assessment materials are in English only. Only answers written in English will be assessed.

8.6 Spiritual, moral, ethical, social, legislative, economic and cultural issues

These specifications offer opportunities which can contribute to an understanding of these issues in the following topics.

Issue	Opportunities for developing an understanding of the issue during the course
Spiritual issues	spiritual development, through helping candidates 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 issues	moral development, through helping candidates reflect on how technology affects the environment so they can make informed choices when designing and making; through discussing the moral dilemmas posed by introducing new technologies within different value systems and the advantages and disadvantages of new technology to local, national and global communities
Ethical issues	helping candidates work together productively on complex tasks and helping them see the benefits of collective co-operation
Social issues	social development, through helping pupils recognise the need to consider the views of others when discussing design ideas
Legislative issues	European examples should be used where appropriate in the delivery of the subject content. Relevant European legislation is identified within the specification where applicable.
Economic issues	economic development: helping candidates make informed decisions about the management and use of materials
Cultural issues	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

8.7 Sustainable development, health and safety considerations and European developments, consistent with international agreements

These specifications support these issues, consistent with current EU agreements, as outlined below:

- the specifications provide 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 specifications' content includes a specific requirement to consider issues associated with health and safety and the environment (see Section 2)
- European examples should be used where appropriate in the delivery of the subject content. Relevant European legislation is identified within these specifications where applicable.

8.8 Key Skills

These specifications provide opportunities for the development of the Key Skills of *Communication, Application of Number, Information and Communication Technology, Working with Others, Improving Own Learning and Performance and Problem Solving* at Levels 1 and/or 2. However, the extent to which this evidence fulfils the Key Skills criteria at these levels will be totally dependent on the style of teaching and learning adopted for each unit.

The following table indicates where opportunities may exist for at least some coverage of the various Key Skills criteria at Levels 1 and/or 2 for each unit.

Unit	C		AoN		ICT		WwO		IoLP		PS	
	1	2	1	2	1	2	1	2	1	2	1	2
A551	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓
A552	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓
A553	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓
A554	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓

8.9 ICT

In order to play a full part in modern society, candidates need to be confident and effective users of ICT. These specifications provide candidates with a wide range of appropriate opportunities to use ICT in order to further their study of Product Design.

Opportunities for ICT include:

- gathering information from the World Wide Web and CD-ROMs
- gathering data using sensors linked to data-loggers or directly to computers
- using spreadsheets and other software to process data
- using animations and simulations to visualise ideas
- using software to present ideas and information on paper and on screen.

8.10 Citizenship

From September 2002, the National Curriculum for England at Key Stage 4 includes a mandatory programme of study for Citizenship.

GCSE Product Design is designed as education for future citizens which not only covers aspects of the Citizenship programme of study but also extends beyond that programme by dealing with important aspects of product design which people encounter in their everyday lives.

Appendix A: Guidance for the production of electronic controlled assessment

Structure for evidence

A controlled assessment portfolio is a collection of folders and files containing the candidate's evidence. Folders should be organised in a structured way so that the evidence can be accessed easily by a teacher or moderator. This structure is commonly known as a folder tree. It would be helpful if the location of particular evidence is made clear by naming each file and folder appropriately and by use of an index called 'Home Page'.

There should be a top level folder detailing the candidate's centre number, candidate number, surname and forename, together with the unit codes A551 and A553, so that the portfolio is clearly identified as the work of one candidate.

Each candidate produces an assignment for controlled assessment. The evidence should be contained within a separate folder within the portfolio. This folder may contain separate files.

Each candidate's controlled assessment portfolio should be stored in a secure area on the centre's network. Prior to submitting the controlled assessment portfolio to OCR, the centre should add a folder to the folder tree containing controlled assessment and summary forms.

Data formats for evidence

In order to minimise software and hardware compatibility issues it will be necessary to save candidates' work using an appropriate file format.

Candidates must use formats appropriate to the evidence that they are providing and appropriate to viewing for assessment and moderation. Open file formats or proprietary formats for which a downloadable reader or player is available are acceptable. Where this is not available, the file format is not acceptable.

Electronic controlled assessment is designed to give candidates an opportunity to demonstrate what they know, understand and can do using current technology. Candidates do not gain marks for using more sophisticated formats or for using a range of formats. A candidate who chooses to use only word documents will not be disadvantaged by that choice.

Evidence submitted is likely to be in the form of word processed documents, PowerPoint presentations, digital photos and digital video.

To ensure compatibility, all files submitted must be in the formats listed below. Where new formats become available that might be acceptable, OCR will provide further guidance. OCR advises against changing the file format that the document was originally created in. It is the centre's responsibility to ensure that the electronic portfolios submitted for moderation are accessible to the moderator and fully represent the evidence available for each candidate.

Accepted File Formats
Movie formats for digital video evidence
MPEG (*.mpg)
QuickTime movie (*.mov)
Macromedia Shockwave (*.aam)
Macromedia Shockwave (*.dcr)
Flash (*.swf)
Windows Media File (*.wmf)
MPEG Video Layer 4 (*.mp4)
Audio or sound formats
MPEG Audio Layer 3 (*.mp3)
Graphics formats including photographic evidence
JPEG (*.jpg)
Graphics file (*.pcx)
MS bitmap (*.bmp)
GIF images (*.gif)
Animation formats
Macromedia Flash (*.fla)
Structured markup formats
XML (*xml)
Text formats
Comma Separated Values (.csv)
PDF (.pdf)
Rich text format (.rtf)
Text document (.txt)
Microsoft Office suite
PowerPoint (.ppt)
Word (.doc)
Excel (.xls)
Visio (.vsd)
Project (.mpp)

Appendix B: Guidance for Controlled assessments Units A551 and A553

B1 Controlled assessment project

Whilst these specifications do not have a material bias, candidates are advised, as a minimum, to have experiences of working with:

- designing and modelling materials (paper, card, foam board, rigid foam)
- ICT
- a range of materials to provide for a wider range of prototype and modelling activities
- light production materials or food ingredients (thin plastics, wood, metal, textiles, fabrics and threads, components, pre-manufactured components; fresh, processed, dried and other ingredients).

Where necessary, other materials should be included, in order to allow candidates choice over their controlled assessment task in Unit A553. These may include heavier sections of materials from the above list, clay, plaster, electronic and other control systems, 'smart' and other modern materials or more varied food ingredients.

It is envisaged that the controlled assessment evidence presented for assessment will represent 20 hours (Unit A551) for the GCSE Short Course and 40 hours (Units A551 and A553) for the GCSE. Some of the work, by its very nature, may be undertaken outside school, for example research work, testing.

OCR expects teachers to supervise and guide candidates who are undertaking work which is internally assessed (i.e. controlled assessment 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 controlled assessment 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, ensure safe working and to prevent plagiarism
- ensure that the work is completed in accordance with the specifications' requirements and can be assessed in accordance with the internal assessment objectives and procedures.

Internally assessed controlled assessment 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, for example research work, testing. As with all internally assessed work, the teacher must be satisfied that the work submitted for assessment is the candidate's own work. Candidate authentication declarations must be completed by candidates prior to certification.

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

- Any copied material must be appropriately 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
  - unit title and code and task title

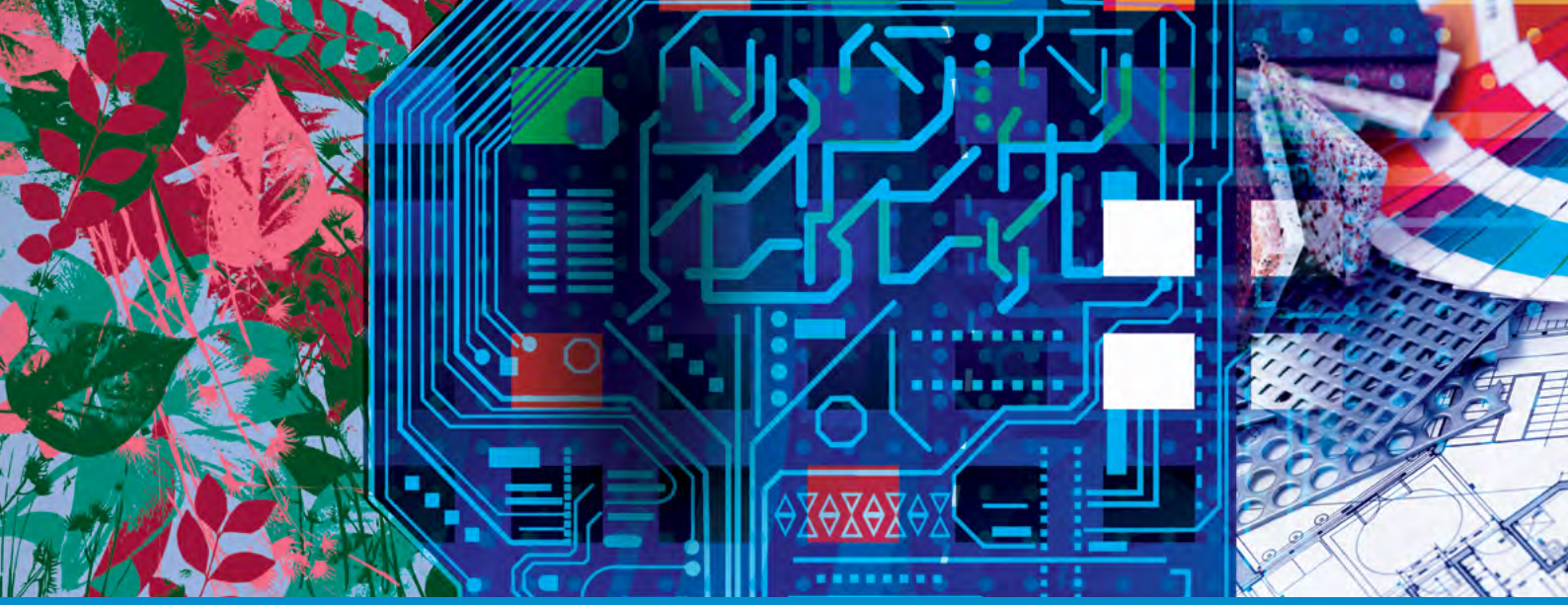
B2 Controlled assessment themes

Candidates may select one of the following themes as a starting point for the controlled assessment projects. Through investigating the theme, candidates can devise their own design brief based on their own interests and ability.

It is not compulsory to select an area for designing from this list of themes. Teachers and/or candidates can devise their own starting point. OCR controlled assessment consultants are available for advice if required.

Extra-terrestrial:	Life forms, housing, food/drink, transport, communication, space travel, attack, defence, communication, townships, visits, friendships, exhibits, museums, air conditioning, alarms, moisture control, language, welcoming, dress, sustainability
Space holidays:	Time lapses/ageing, travel, games, sustenance, storage, luggage, boredom/being occupied, alternative sporting activities, weightlessness, comfort, instrumentation, sleeping, recording, uniforms
Extreme sports:	Surfing, diving, bungee jumping, wall climbing, clothing, skydiving, microlighting, communications, meals on the move, publicity, equipment, safety, audiences, seating, recording/records, sustainability
Celebrations:	Birth, religious, personal, national, sporting, retirement, driving, examinations, certificates, trophies, invitations, accommodation, clothing, family, funerals, cards, music, meals/cakes/drinks, gifts, sustainability
Festivals:	Religious, cultural, harvest, music, song, sound, thanksgiving, Ramadan, truck fest, motoring, camping, sustenance, advertising, promotion, safety, steam fairs, gifts, clothing
Sports:	Events, matches, Olympics, Winter Olympics, World games, Commonwealth games, school sports days/matches, tournaments, promotion, refreshments, record keeping, trophies, certificates, footwear, changing rooms, rewards, sports kit, sustainability
Media:	Music, dance, theatre, cinema, seating, props, refreshments, first aid, dress, performance, communication, ticketing, monitoring, sound systems, advertising
Events:	Glastonbury, Chelsea flower show, seating, props, refreshments, first aid, performance, communication, ticketing, monitoring, sound systems, advertising, safety, accommodation, transport, parking, traffic flow, clothing, uniforms, sustainability
Prehistoric times:	Animals, plants, food chain, shelter, man v nature, temperature, H^2O, film/film sets, museums/exhibits, research, excavation, recording, contamination, clothing, promotion
Health & fitness:	Types, equipment, recording, advertising, lighting, clubs/club rooms, 5 a day, balance, clothing, uniforms, swimming, time keeping, storage, transportation, contact sports, non-contact sports, changing rooms, referees

Crime:	Forensics, investigations, 'Cluedo', murder mystery, board games, participation, mood stimulation, multi-functional, incorporation, clues, red herrings, science, exclusion, winning, clothing, uniforms, contamination, identification, victims, jail, punishments, courthouse, prevention, support
Transportation:	Travel, driving, passengers, conducting, uniforms, maintenance, tool kits, storage, monitoring, ticketing, advertising, waiting, luggage, warmth, space, boredom, environment, seating, safety, entertainment, sustainability
Food on the move:	In-flight catering, at sea, spillage, marathons, space travel, camping, storage, heating, cooking, uniforms, re-use, washing up, transportation, identification, contamination, balance, in-car picnics, rail travel, sustainability
My environment:	Hobbies, home, work, school, swimming pools, keep fit, sustenance, recording, communication, sleeping, music, sport, travel, cycling, reading, lighting, storage, sustainability



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