



Qualifications and
Curriculum Authority



Llywodraeth Cynulliad Cymru
Welsh Assembly Government



Rewarding Learning

GCE AS and A level subject criteria for design and technology

September 2006

QCA/06/2845

Contents

1. Introduction	3
2. Aims	3
3. Subject content	4
4. Key skills	8
5. Assessment objectives	8
6. Scheme of assessment	9

1. Introduction

- 1.1 Advanced subsidiary (AS) and advanced (A) level subject criteria describe the general requirements for knowledge, understanding and skills common to all AS and A level specifications. They set out the assessment objectives shared by specifications in design and technology. They provide the framework within which the awarding body creates the detail of the specification.

Subject criteria are intended to:

- help ensure consistent and comparable standards in the same subject across the awarding bodies
- define the relationship between the AS and A level specifications, with the AS as a subset of the A level
- ensure that the rigour of A level is maintained
- help higher education institutions and employers know what has been studied and assessed.

Any GCE specification that contains significant elements of the subject design and technology must be consistent with the relevant parts of these subject criteria.

2. Aims

- 2.1 AS and A level specifications in design and technology should encourage students to:
- make use of tacit knowledge and reflective practices in order to work with tasks that are challenging and often require definition
 - develop and sustain their creativity and innovative practice
 - recognise and overcome challenges and constraints when working towards the production of high-quality products
 - develop a critical understanding of the influences of the processes and products of design and technological activities from a contemporary and historical perspective
 - draw on a range of skills and knowledge from other subject areas
 - draw on and apply knowledge, understanding and skills of production processes to a range of design and technology activities
 - develop an understanding of contemporary design and technology practices
 - use digital technologies and information-handling skills to enhance their design and technological capability

- recognise the values inherent in design and technological activities, and develop critical evaluation skills in technical, aesthetic, ethical, economic, environmental, sustainable, social, cultural and entrepreneurial contexts.

3. Subject content

3.1 AS and A level specifications in design and technology should build on knowledge, understanding and skills established in other key stages.

3.2 Specifications should enable progression from AS to A2.

Knowledge, understanding and skills

3.3 All AS and A level specifications in design and technology (technology and design in Northern Ireland) must require candidates to cover the design and technology skills, knowledge and understanding set out in sections 3.6 and 3.7 below.

AS and A level specifications in design and technology should also enable candidates to specialise in a cognate area or areas such as product design, systems and control, or food. In developing AS and A level specifications all focus areas should be of equal demand.

3.4 In AS specifications, appropriate knowledge, understanding and skills must be set in the following domains:

- exploring materials, components and their uses, and understanding contemporary design and technology practices
- understanding processes of product development.

3.5 A level specifications must include:

- in-depth study related to the chosen focus area
- the holistic application of knowledge and understanding in a product development process.

3.6 Skills

Communicating ideas and information

Develop appropriate approaches to:

- a) using digital technology for designing, modelling and communicating
- b) communicating ideas and design possibilities

- c) recording and explaining design decisions
- d) communicating information to enable others to interpret design intentions.

Evaluating

Develop and use strategies to:

- a) determine the degree of accuracy required for products to perform as intended and choose suitable methods of measurement
- b) identify and apply relevant external standards to their design tasks
- c) gather evidence to assess the extent to which their work will meet needs or market opportunities
- d) engage in feasibility studies on the practicability of proposed solutions to problems
- e) use personal and external sources for evaluating products.

Designing

Develop and use strategies to:

- a) clarify tasks
 - i. Identify a wide range of user needs and explore the nature of problems to be solved, engaging in in-depth research and seeking specialist advice and information
 - ii. Develop initial design briefs and outline/detailed specifications
 - iii. Design for manufacturing, maintenance and product life and sustainability
- b) generate and develop ideas
 - i. Use appropriate techniques to generate and explore ideas
 - ii. Understand and use appropriate techniques to analyse and evaluate ideas.
- c) develop proposals
 - i. Use appropriate techniques to model detailed aspects of ideas and proposals
 - Use knowledge and understanding of the working characteristics of materials and components/ingredients, and restrictions imposed by equipment and processes to prepare detailed design proposals that meet specifications.

Planning

Develop strategies:

- a) using an awareness of industrial methods and approaches to design, manufacture and quality control
- b) for selecting an appropriate range of equipment and processes to generate quality products

- c) for organising and managing time and resources effectively, responding to changing circumstances
- d) using digital technologies appropriately for planning and data handling
- e) to encourage collaborative skills.

Making

- a) Use digital technologies appropriately for communicating, modelling, controlling and manufacturing.
- b) Work creatively, innovatively, safely and skilfully to produce high-quality products or outcomes.
- c) Experiment with techniques in order to improve and refine intended methods of realising a design.
- d) Demonstrate a detailed knowledge of the working properties and functions of materials and components/ingredients.
- e) Demonstrate care, precision and attention to detail in the use of equipment and materials.
- f) Manufacture appropriate outcomes working to plans that identify resources needed. Make use of a variety of planning approaches and work to agreed deadlines.
- g) Achieve optimum use of materials and components/ingredients by taking into account the relationship between: material, form and manufacturing processes; the scale of production; the environmental factors affecting disposal of waste, surplus and by-products; sustainability and costs.
- h) Consider outcomes by using and/or developing quality procedures, assessing the impact of actions by reviewing and establishing the best approach. Review the way the work plan is followed after considering its effectiveness in order to achieve improvements.
- i) Use and select appropriate methods of testing the performance of products against specified criteria and act on findings. Ensure through testing, modification and evaluation that the quality of outcomes is suitable for the intended user.

3.7 Knowledge and understanding

Materials and components

Candidates should demonstrate the application and understanding of:

- a) a range of materials including modern materials
- b) properties and working characteristics of materials
- c) principles and techniques of testing

- d) methods of preparing, processing, manipulating and combining materials/ingredients to enhance their properties.

Industrial and commercial practice

Candidates should demonstrate an understanding of:

- a) the main features of manufacturing industry, including human resources and commercial practices
- b) modern manufacturing systems
- c) stages of production
- d) detailed manufacturing methods, when combining or processing materials
- e) service to the customer, including legal requirements, availability of resources
- f) the forms of energy used by industry, its impact on design, manufacturing, sustainability and the environment.

Quality

Candidates should demonstrate and understand quality in terms of:

- a) fitness for purpose
 - meeting the criteria of the specification
 - accuracy of production
 - appropriate use of technology
 - aesthetics
- b) the human need.

Health and safety

Candidates should have a knowledge and understanding of:

- a) the regulatory and legislative frameworks for health and safety
- b) safe working practices, including identifying hazards and making risk assessments.

Systems and control

Candidates should have a knowledge and understanding of systems and control processes as appropriate to the focus area.

Products/outcomes and applications

Candidates should develop knowledge and understanding of:

- a) the processes involved in the production of a range of manufactured products
- b) the form, function and ergonomic requirements of different products

- c) the impact of trends, styles, new technical capabilities, and social, political and ethical influences on design, production and sale of products
- d) values (technical, economic, aesthetic, social, environmental, sustainable and moral) implicit in design and technology activities.

4. Key skills

4.1 AS and A level specifications in design and technology should provide opportunities for developing and generating evidence for assessing relevant key skills from the list below. Where appropriate these opportunities should be directly cross-referenced, at specified level(s), to the key skills standards, which may be found on the QCA website (www.qca.org.uk).

- Application of number
- Communication
- Improving own learning and performance
- Information and communication technology
- Problem solving
- Working with others

5. Assessment objectives

5.1 The assessment objectives and the associated weightings for AS and A level are the same.

Knowledge, understanding, skills and their applications are closely linked. AS and A level specifications should require that all candidates demonstrate the following assessment objectives in the context of the content and skills prescribed.

The assessment objectives are to be weighted in all specifications as indicated.

Assessment objectives		Weighting
AO1	Candidates should demonstrate specific knowledge and understanding and be able to apply that knowledge and understanding in combination with appropriate skills in their designing, and should communicate ideas and outcomes and demonstrate strategies for evaluation.	40–60%
AO2	Candidates should be able to demonstrate and apply skills, knowledge and understanding of relevant materials, processes and techniques, and use materials and equipment to produce suitable and appropriate outcomes, and should communicate ideas and outcomes and demonstrate strategies for evaluation.	40–60%

The assessment objectives apply to the whole specification for AS and A level.

6. Scheme of assessment

- 6.1 All specifications should ensure that there is a balance between the weighting of assessment of AS and A level content in the overall A level scheme of assessment.
- 6.2 In AS and A2 specifications the minimum weighting for internal assessment is 30 per cent and the maximum 60 per cent (with an upper limit of 60 per cent of the A2 component).

Internal assessment

- 6.3 Where internal assessment is included, specifications must make clear how reliability and fairness are secured, by setting out requirements that ensure the robustness of each stage of the internal assessment, ie:
- the specific skills to be assessed
 - setting of tasks
 - extent of supervision in carrying out of tasks
 - conditions under which assessment takes place
 - marking of the assessment and internal standardising procedures
 - any moderation process.

Synoptic assessment

- 6.4 At A2 internal and external assessment must include tasks in which candidates combine their designing and making skills with knowledge and understanding. Such tasks may vary in duration and the emphasis placed on particular assessment objectives may vary between them.

Quality of written communication

- 6.5 AS and A level specifications will be required to assess the candidates' quality of written communication in accordance with the guidance document produced by QCA.