RECOGNISING ACHIEVEMENT

GCSE

Engineering

OCR GCSE (Single Award) in Engineering J322

OCR GCSE (Double Award) in Engineering J344

February 2010

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Contents

Contents

Vertical black lines indicate a change to previous versions of the specification. Changes can be found on pages 27, 28 and 33.

1 About these Qualifications

This booklet contains OCR's GCSE Single Award and GCSE Double Award specifications in Engineering for teaching from September 2009. Candidates study **two** units for a Single Award and **four** units for the Double Award.

Key features of this specification:

- candidates are actively involved in the design, production and evaluation of products and the methods by which these products are engineered;
- it encourages candidates to explore the engineering world through experimentation and development in design and technology;
- candidates can work in one or more material areas including food, textiles, paper and card, ceramics and resistant materials;
- candidates are encouraged to use new technology and new materials;
- there is specific focus on the engineering and production of products for use by a third party: the consumer;
- the units are weighted to encourage quality and depth of understanding;
- it is assessed through Controlled Assessment and computer-based technology (CBT) examined units.

The GCSE in Engineering has been designed to provide the technical knowledge, skills and understanding associated to equip candidates with some of the skills they will need in the workplace, in further education or training such as Diplomas, GCEs, NVQs or Modern Apprenticeships. It is designed to be delivered in full-time or part-time education.

Examples of appropriate employment to which a GCSE in Engineering candidate might progress include:

- automotive engineering, such as car and other vehicle manufacture and servicing;
- domestic goods manufacture and servicing;
- telecommunication servicing;
- ICT equipment maintenance;
- large- and small-scale engineering workshops.

This specification is fundamentally designed to assess a candidate's capability at the end of KS4; however, units will be offered in January and June, thereby allowing some flexibility.

1.1 GCSE (Single Award)

The GCSE (Single Award) is both a 'stand-alone' qualification and also the first half of the corresponding GCSE (Double Award). The GCSE (Single Award) is assessed at the same standard as the corresponding GCSE (Double Award).

From September 2009 the GCSE (Single Award) is made up of two mandatory units, one of which is externally assessed and another that is internally assessed and externally moderated. The GCSE (Single Award) units form 50% of the corresponding GCSE (Double Award).

1.2 GCSE (Double Award)

From September 2009 the GCSE (Double Award) is made up of four mandatory units that include the corresponding GCSE (Single Award) units and two further units. Two units are externally assessed and two units are internally assessed and externally moderated.

1.3 Qualification Titles and Levels

These qualifications are shown on a certificate as:

OCR GCSE Engineering.

OCR GCSE (Double Award) Engineering.

These qualifications are approved by the regulatory authorities (QCA, DCELLS and CCEA) as part of the National Qualifications Framework.

Candidates who gain Grades D to G (CD to GG) will have achieved an award at Foundation Level 1 (Level 1 of the National Qualifications Framework).

Candidates who gain Grades A* to C (A*A* to CC) will have achieved an award at Intermediate Level 2 (Level 2 of the National Qualifications Framework).

1.4 Aims and Learning Outcomes

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

All specifications in engineering must enable candidates to:

- actively engage in the processes of engineering to develop as effective and independent individuals;
- understand the contribution that engineering makes to society and the economy;
- develop an awareness and appreciation of commercial and industry issues and emerging technologies in the context of engineering;
- develop and use a range of transferable skills when designing and making engineered products to enable them to become effective and independent individuals;
- develop an awareness and understanding of environmental issues and sustainable development;
- develop applied engineering skills as a foundation for future learning and progression;
- apply their knowledge and understanding of engineering by using skills of evaluation and problem solving.

1.5 Prior Learning/Attainment

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

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

Prior learning, skills and aptitudes particularly relevant include:

- basic craft skills;
- some aptitude for ICT;
- basic drawing skills;
- some motivation to work independently.

There is however no prior knowledge required for this specification.

2 Summary of Content

This specification provides opportunities for candidates to develop knowledge, skills and understanding in the context of real-world engineering, and by encouraging learning through links with and study of real engineering companies. Courses of study following this specification will be broad, coherent and satisfying. Candidates are encouraged to be inspired and motivated, and to gain an insight into related sectors, such as manufacturing, while being prepared to make informed decisions about further learning opportunities and career choices.

GCSE specifications in engineering must require candidates to develop and demonstrate knowledge and understanding of engineering materials and their properties in the following groups:

- the functions of components;
- the properties, characteristics and features of materials;
- engineering processes;
- quality control techniques;
- new technology used in and by the engineering industries;
- impact of modern technologies;
- design a product;
- engineer a product.

For the Single Award, the candidates must complete **two** mandatory units, which are:

- A621 Controlled Assessment;
- A622 Examined unit.

For the Double Award, the candidates must complete **four** mandatory units, which are:

- A621 Controlled Assessment;
- A622 Examined unit;
- A623 Controlled Assessment;
- A624 Examined unit.

Unit A621

This Controlled Assessment unit is divided into two sections (A and B) and both sections must be completed and entered for moderation at the same time. Candidates will investigate a variety of engineered products detailed by OCR that have been developed through the use of modern technology. The impact of modern technology on design and production will be assessed across products from a range of engineering industries.

Candidates will focus on a particular product selected from a list provided by OCR (see Appendix B) together with two more modern equivalents of the same product. Candidates will evidence their findings and conclusions using a portfolio, which may be presented electronically or in printed format.

Unit A622

This unit can be assessed by a one hour computer-based test or a one hour written examination. Questions can be a mix of short answer and free response styles, and will require candidates to demonstrate practical application of knowledge related to engineered products and engineering environments they have studied. Where possible, links should be made with an engineering company to allow candidates access and exposure to 'real-life' engineering practice. Candidates could concentrate on one engineering sector and should study a range of products.

Unit A623

This Controlled Assessment unit is divided into two sections (A and B) and both sections must be completed and entered for moderation. Candidates will study the engineering of a product. The engineering of the product could be observed through 'real-life' experiences such as industrial visits or work experience. Alternatively, the product could be researched using commercially or centre-produced resource materials. Candidates will evidence their findings and conclusions using a portfolio, which may be presented electronically or in printed format.

Unit A624

This examined unit can be assessed by a one hour computer-based test or a one hour written examination. Questions will be a mix of short answer and free response styles, and will require candidates to demonstrate practical application of knowledge related to engineered products and engineering environments they have studied. In particular they should focus on engineering for sustainability. Where possible, links should be made with an engineering company to allow candidates access and exposure to real-life engineering practice. Candidates should study a range of products from at least two engineering sectors.

2.1 GCSE (Single Award) Units

This Controlled Assessment unit is divided into two sections (A and B) and both sections must be completed and entered for moderation at the same time.

Unit A621: *1A Study of an Engineered Product & 1B Engineering a Product (Controlled Assessment)*

1A Study of an Engineered Product

In this unit, the candidate will consider:

- the impact of modern technologies;
- production details (materials and components, available technology);
- engineering processes;
- design solutions.

1B Engineering a Product (Controlled Assessment)

In this unit, the candidate will consider:

- analyse client design briefs for engineered products;
- develop design solutions for engineered products;
- engineer a product;
- analyse and revise the completed product, taking into account how it could be improved.

Unit A622: *Engineering Processes (Examined Unit*)

In this unit, candidates will consider:

- engineering materials and their properties;
- function of components;
- the properties, characteristics and features of materials;
- engineering processes;
- quality control techniques;
- engineering a product.

2.2 GCSE (Double Award) Units

GCSE (Double Award) candidates will take units A621/622 and A623/624 outlined below.

This Controlled Assessment unit is divided into two sections (A and B) and both sections must be completed and entered for moderation at the same time.

Unit A621: *1A Study of an Engineered Product & 1B Engineering a Product (Controlled Assessment)*

1A Study of an Engineered Product

In this unit, candidates will consider:

- impact of modern technologies;
- production details (materials and components, available technology);
- engineering processes;
- design solutions.

1B Engineering a Product

In this unit, candidates will:

- consider the analysis of client design briefs for engineered products;
- generate design solutions for engineered products;
- engineer a product;
- analyse and revise the completed product, taking into account how it could be improved.

Unit A622: *Engineering Processes (Examined Unit*)

In this unit, candidates will consider:

- engineering materials and their properties;
- the function of components;
- the properties, characteristics and features of materials;
- engineering processes;
- quality control techniques;
- engineering a product.

Unit A623: *3A Real World Engineering & 3B Making an Engineered Product (Controlled Assessment)*

3A Real World Engineering

In this unit, candidates will consider:

- stages in engineering a product;
- production details and constraints;
- material and constraints;
- systems and control technology;
- modern technologies.

3B Making an Engineered Product

In this unit, candidates will consider:

- production planning;
- engineering prototyping;
- health and safety and quality control;
- analysis and revision.

Unit A624: *Impact of Modern Technologies on Engineering (Examined Unit)*

In this unit, candidates will consider:

- sustainability design for the environment;
- engineering materials and their properties;
- the functions of components;
- the properties, characteristics and features of materials;
- engineering processes;
- quality control techniques;
- new technologies used in and by the engineering industries;
- the impact of modern technologies;
- advantages and disadvantages that the use of modern technology has brought to society;
- engineered products;
- designing a product;
- engineering a product.

3 Content

3.1 Unit A621: *1A Study of an Engineered Product* (*Controlled Assessment*)

This Controlled Assessment unit is divided into two sections (A and B) and both sections must be completed and entered for moderation at the same time.

Candidates will investigate a variety of engineered products detailed by OCR that have been developed through the use of modern technology.

Candidates will then focus on a particular product selected from a list provided by OCR (see Appendix B) together with two more modern equivalents of the same product. They will evidence their research for inclusion within a portfolio, which may be completed electronically or in printed format.

Unit A621 *1A Study of an Engineered Product (Controlled Assessment)*	
Candidates are required to do a product analysis of a product and its modern equivalents selected from a list provided by OCR.	
Impact of modern technologies	Candidates should be able to give a fully detailed description of: • the impact of modern technologies, smart materials and components on their development; • the advantages and disadvantages that the use of modern technology has brought to society.
Production details (materials and components, available technology)	Candidates should be able to give a fully detailed and justified explanation of the use of materials and components and their: • properties; • characteristics; • performance; • cost.
Engineering processes	Candidates should be able to give a fully detailed and justified explanation of the engineering processes used.

Candidates are required to do a product analysis of a product and its modern equivalents selected from a list provided by OCR.

Design solutions	Candidates should be able to suggest and explain in detail: • design solutions; • sustainability issues.

3.2 Unit A621: *1B Engineering a Product (Controlled Assessment)*

Candidates will select a customer design brief from a list issued by OCR (see Appendix B).

Candidates are required to analyse the customer design brief, and engineer and evaluate the selected solution. They will also present their selected idea.

Portfolio evidence can be submitted on paper or electronically. All electronic evidence must be presented in a format that matches the requirements outlined in Appendix D: Guidance for the Production of Electronic Controlled Assessment.

Unit A621 *1B Engineering a Product (Controlled Assessment)*	
Analyse client design briefs for engineered products	Candidates should be able to: • provide a detailed and justified analysis of the client brief; • produce and fully apply a justified design specification.
Generate design solutions for engineered products	Candidates should be able to: • develop a wide range of annotated design ideas and use appropriate engineering drawings to current industry standards; • present and fully justify their selection of design solution for the engineered product; • consider client feedback, respond appropriately and justify changes made.
Engineer a product	Candidates should be able to: • make a complete, high-quality prototype of the design solution; • select and safely use a wide range of appropriate materials, parts and components, processes, tools and equipment; • appropriately apply and detail a range of quality control techniques.
Analyse and revise the completed product, taking into account how it could be improved	Candidates should be able to: • suggest detailed and justified modifications to the design solution and original specification, giving consideration to the use of modern materials, processes and technologies.

3.3 Unit A622: *Engineering Processes (Examined Unit)*

This unit will be assessed by a one hour computer-based test or a one hour written examination. Questions will be a mix of short answer and free response styles, and will require candidates to demonstrate practical application of knowledge related to engineered products and engineering environments they have studied.

Where possible, links should be made with an engineering company to allow candidates access and exposure to 'real-life' engineering practice. Candidates could concentrate on one engineering sector and should study a range of products.

Aerospace

- wing
- rotors
- passenger aircraft doors

Automotive

- wheels
- glass (privacy, quick-clear, laminated)
- safety features

Chemical & Process

- coatings (paint, plastics)
- cement
- shampoo

Computers, Communication and IT

- portable data storage
- webcams
- radio

Electrical and Electronics

- electric toothbrush
- smoke alarm
- radio-controlled car

Medical and Pharmaceutical

- blister packs
- wheelchairs
- monitors (heart, blood pressure)

Rail and Marine

- passenger information systems
- power sources (wind, electricity, fossil fuels, human, solar)
- safety features

Structural and Civil

- tunnels
- artificial environment domes (eg eco-domes, arboretum, leisure, winter sports domes)
- wind power generators

Unit A622 *Engineering Processes (Examined Unit)*	
Candidates will demonstrate knowledge and understanding of the following:	
Engineering materials and their properties in the following groups:	• ferrous and non-ferrous metals and alloys; • polymers; • ceramics; • composites that combine the properties of different materials.
Function of components:	• mechanical components; • electrical/electronic components; • pneumatic/hydraulic components.
The properties, characteristics and features of materials that affect their:	• ability to be shaped and formed; • ability to be treated; • ability to be given a surface finish; • ease of handling; • cost implications; • availability, form and supply.
Engineering processes:	• material removal; • shaping and manipulation; • joining and assembly; • heat and chemical treatment; • surface finishing.
Quality control techniques:	• checking task outcomes against design brief; • sampling; • comparing results with intended results; • action to be taken.
New technology used in and by the engineering industries:	• information, communications and digital technologies – research, digital communication with clients, suppliers; • modern and smart materials and components – which are used in products manufactured in a chosen sector; • systems and control technology to organise, monitor and control production – basic control systems and technology in terms of input/output (IO) and feedback.

Unit A622 *Engineering Processes (Examined Unit)* (continued).	
Candidates will demonstrate knowledge and understanding of the following:	
Impact of modern technologies:	• when manufacturing an engineered product – impact on workforce, company and local environment; • on engineered products – to end user; • on engineering industries – sustainability.
Stages in manufacturing an engineered product:	• design; • marketing; • production planning; • material supply and control; • processing and production; • assembly and finishing; • packaging and dispatch; • disposal.
Advantages and disadvantages that the use of modern technology has brought to society including:	• redundancy; • working conditions; • cost; • availability of products; • impact on the environment; • training; • transport; • lifestyle; • health and safety.
Engineered products:	• a variety of engineered products that use modern technology; • the impact of modern technology on the design and production of a range of engineered products.
Designing a product:	• analysing client design briefs for engineered products; • producing, using and modifying design specifications for engineered products; • generating design solutions for engineered products; • reading, understanding and creating a range of appropriate engineering drawings to current industry standards; • presenting a design solution for engineered products; • responding to client feedback.

Unit A622 *Engineering Processes (Examined Unit)* (continued).	
Candidates will demonstrate knowledge and understanding of the following:	
Engineering a product:	• producing and using production plans; • selecting and using a range of appropriate materials, parts and components; • selecting and using appropriate processes; • applying quality control techniques; • selecting and using appropriate tools and equipment; • applying health and safety procedures; • analysing and revising the completed product, taking into account how it could be improved.

3.4 Unit A623: *3A Real World Engineering (Controlled Assessment)*

This Controlled Assessment unit is divided into two sections (A and B) and both sections must be completed and entered for moderation at the same time.

Candidates will study the engineering of a product. The engineering of the product could be observed through 'real-life' experiences such as industrial visits or work experience. Alternatively the product could be researched using commercially or centre-produced resource materials.

Candidates will evidence their findings and conclusions for inclusion within a portfolio, which may be completed electronically or in printed format.

Unit A623 *3A Real World Engineering (Controlled Assessment)*	
Candidates are required to:	
Indicate the stages in engineering a product	Candidates should be able to: • identify and fully explain all the stages in engineering the product.
Consider production details and constraints	Candidates should be able to identify and fully explain the production details and constraints to include: • labour; • available technology; • quality standards; • handling and storage.
Identify materials and constraints	Candidates should be able to: • fully consider the identified product giving detail, and justify all materials and components and their constraints through their availability, form and supply.
Consider systems and control technology	Candidates should be able to: • identify and fully explain systems and control technology, and to organise, monitor and control production of the product.
Identify and discuss the impact of modern technologies	Candidates should be able to: • identify and fully explain the impact of modern technologies when engineering the product.

3.5 Unit A623: *3B Making an Engineered Product (Controlled Assessment)*

This Controlled Assessment unit is divided into two sections (A and B) and both sections must be completed and entered for moderation at the same time.

Candidates must select a product from a list issued by OCR (see Appendix B). Candidates will then produce and apply a detailed production plan to engineer a high quality prototype of the product. Health and safety and quality control will both be considered and applied together with an analysis and revision of the completed product.

Portfolio evidence can be submitted on paper or electronically. All electronic evidence must be presented in a format that matches the requirements outlined in the Electronic Portfolio section of the teacher guide.

Work should be individually produced and reflect only the tasks undertaken by the individual candidates.

Unit A623 *3B Making an Engineered Product (Controlled Assessment)*	
Candidates are required to:	
Undertake production planning	Candidates should be able to: • produce and fully apply a detailed production plan.
Develop an engineering prototyping	Candidates should be able to: • make a complete, high quality prototype of the engineered product. Candidates should be able to select use and justify the use of a wide range of appropriate: • processes; • materials; • parts; • components; • tools; • equipment.
Apply health and safety and quality control	Candidates should be able to: • fully detail their individual application of health and safety procedures and quality control techniques.
Analyse and revise products	Candidates should be able to: • analyse and revise the completed product and fully explain how and why it could be improved.

3.6 Unit A624: *Impact of Modern Technologies on Engineering (Examined Unit)*

This unit will be assessed by a one hour computer-based test or a one hour written examination. Questions will be a mix of short answer and free response styles, and will require candidates to demonstrate practical application of knowledge related to engineered products and engineering environments they have studied. In particular they should focus on engineering for sustainability.

Where possible, links should be made with an engineering company to allow candidates access to 'real-life' engineering practice. They should study a range of products from at least two engineering sectors.

Aerospace

- landing gear
- turbines
- passenger aircraft doors

Automotive

- fairings
- seating
- displays

Chemical & Process

- cement
- washing up liquid
- coatings (paint, plastics)

Computers, Communication and IT

- PDA
- video conferencing systems
- radio

Electrical and Electronics

- electric toothbrush
- vending machine
- security system

Medical and Pharmaceutical

- household disability aids (eating and drinking, gripping and turning, reaching)
- mobility aids (scooters, powered wheelchairs)
- heart monitors

Rail and Marine

- drive systems
- navigation
- safety features

Structural and Civil

- tunnels
- temporary accommodation (site buildings, emergency)
- outdoor storage

Unit A624 *Impact of Modern Technologies on Engineering (Examined Unit)*	
Candidates will demonstrate knowledge and understanding of the following:	
Sustainability: design for the environment:	• manufacture without producing hazardous waste; • use of clean technologies; • reduction of product chemical emissions; • reduction of product energy consumption; • use of non-hazardous recyclable materials; • use of recycled material and reused components; • design for ease of disassembly; • product reuse or recycling at end of life.
Engineering materials and their properties in the following groups:	• ferrous and non-ferrous metals and alloys; • polymers; • ceramics; • composites that combine the properties of different materials.
The functions of:	• mechanical components; • electrical/electronic components; • pneumatic/hydraulic components.
The properties, characteristics and features of materials that affect:	• ability to be shaped and formed; • ability to be treated; • ability to be given a surface finish; • ease of handling; • cost implications; • availability, form and supply.
Engineering processes:	• material removal; • shaping and manipulation; • joining and assembly; • heat and chemical treatment; • surface finishing.
Quality control techniques:	• sampling; • comparing; • action.

Unit A624 *Impact of Modern Technologies on Engineering (Examined Unit)* (continued).	
Candidates will demonstrate knowledge and understanding of the following:	
New technology used in and by the engineering industries:	• information, communications and digital technologies – research, production planning systems, digital communication with clients, suppliers; • modern and smart materials and components; • systems and control technology to organise, monitor and control production: automation; sensors; inputs; outputs; CAD CAM CIE.
Impact of modern technologies:	• when manufacturing an engineered product – impact on workforce, company and local environment: on engineered products – to end user; on engineering industries – sustainability; stages in manufacturing an engineered product: design; marketing; production planning; material supply and control; processing and production; assembly and finishing; packaging and dispatch; disposal.
Advantages and disadvantages that the use of modern technology has brought to society:	• redundancy; • working conditions; • cost; • availability of products; • impact on the environment; • training; • transport; • lifestyle; • health and safety.
Engineered products:	• a variety of engineered products that use modern technology; • the impact of modern technology on the design and production of a range of engineered products.

Unit A624 *Impact of Modern Technologies on Engineering (Examined Unit)* (continued).	
Candidates will demonstrate knowledge and understanding of the following:	
Designing a product:	• analysing client design briefs for engineered products; • producing, using and modifying design specifications for engineered products; • generating design solutions for engineered products; • reading, understanding and creating a range of appropriate engineering drawings to current industry standards; • presenting a design solution for engineered products; • responding to client feedback.
Engineering a product:	• producing and using production plans; • selecting and using a range of appropriate materials, parts and components; • selecting and using appropriate processes; • applying quality control techniques; • selecting and using appropriate tools and equipment; • applying health and safety procedures; • analysing and revising the completed product, taking into account how it could be improved.

4 Schemes of Assessment

4.1 GCSE (Single Award) Scheme of Assessment

<table>
<tr><th colspan="2">GCSE (Single Award) Engineering (J322)</th></tr>
<tr><td colspan="2">Unit A621: 1A Study of an Engineered Product & 1B Engineering a Product (Controlled Assessment)</td></tr>
<tr><td>60% of the total GCSE (Single Award) marks
Section 1A:
• 20% of the total GCSE (Single Award) marks are awarded for section A.
• 30 marks</td><td>Section 1A Study of an Engineered Product:
Candidates are required to undertake a product analysis of a product (selected from a list provided by OCR) and its modern equivalents. The candidate should identify two similar products, to the initial selected product, that have been developed through the influence of modern technologies. Once the range of products has been identified, a thorough product analysis should be carried out.</td></tr>
<tr><td>Section 1B:
• 40% of the total GCSE (Single Award) marks are awarded for section B.
• 60 marks</td><td>Section 1B Engineering a Product:
Candidates are required to work from a given client brief selected from a list of tasks provided by OCR.
They will analyse the client brief, produce and design a specification and produce a range of design ideas.
They will then produce a quality prototype and finally carry out a full evaluation of the finished product.
The time limit available to complete each assessment task is approximately 20 hours
For guidance on the suggested time allocation for controlled assessment see section 5.3.2
This unit is internally assessed and externally moderated.</td></tr>
<tr><td colspan="2">Unit A622: Engineering Processes (Examined Unit)</td></tr>
<tr><td>40% of the total GCSE (Single Award) marks
1 hr computer-based test or written paper
60 marks</td><td>This unit will be assessed by a one hour computer-based test or written examination. Questions will be a mix of short answer and free response styles, and will require candidates to demonstrate practical application of knowledge related to engineered products and engineering environments they have studied.
This unit is externally assessed.</td></tr>
</table>

4.2 GCSE (Double Award) Scheme of Assessment

GCSE (Double Award) Engineering (J344)	
GCSE Single Award units as above, Unit A621 being 30% and Unit A622 being 20% of the total GCSE (Double Award) marks.	
Unit A623: *3A Real World Engineering & 3B Making an Engineered Product (Controlled Assessment)*	
30% of the total GCSE (Double Award) marks Section 3A: • 10% of the total GCSE (Double Award) marks are awarded for section A. • 30 marks	**Section 3A** Real World Engineering: Candidates are required to undertake the study of an engineered product from the first stage of production through all the associated stages up to the completed item being delivered to the client.
Section 3B: • 20% of the total GCSE (Double Award) marks are awarded for section B. • 60 marks	**Section 3B** Making an Engineered Product: Candidates are required to work from a given product provided by OCR. The candidate will be expected to present production details including working drawings about the product, leading to the production of an assembled quality product. Care will be taken to follow health and safety requirements and quality assurance procedures will be fundamental during the production process. A final evaluation will reflect on processes, tools and machinery used as well as how the product could be improved.
	The time limit available to complete each assessment task is approximately 20 hours For guidance on the suggested time allocation for controlled assessment see section 5.3.2
	This unit is internally assessed and externally moderated.
Unit A624: *Impact of Modern Technologies on Engineering (Examined Unit)*	
20% of the total GCSE marks 1 hr computer-based test or written paper 60 marks	This unit will be assessed by a one hour computer-based test or written examination. Questions will be a mix of short answer and free response styles, and will require candidates to demonstrate practical application of knowledge related to engineered products and engineering environments they have studied. In particular they should focus on engineering for sustainability.
	This unit is externally assessed.

4.3 Entry Options

GCSE (Single Award) candidates must be entered for units A621 and A622.

GCSE (Double Award) candidates must be entered for all four units.

Candidates must be entered for certification to claim their overall GCSE qualification grade. All candidates should be entered under the following certification codes:

OCR GCSE in Engineering: J322

OCR GCSE (Double Award) in Engineering: J344

4.4 Tiers

This scheme of assessment is untiered, covering all of the ability range grades from A* to G (A*A* to GG). Candidates achieving less than the minimum mark for Grade G (GG) will be ungraded.

4.5 Assessment Availability

There are two examination series each year, in January and June.

Assessment availability can be summarised as follows:

Unit	January 2010	June 2010	January 2011	June 2011	January 2012 etc
A621	✓	✓	✓	✓	✓
A622	✓	✓	✓	✓	✓
A623	✓	✓	✓	✓	✓
A624	✓	✓	✓	✓	✓

4.6 Assessment Objectives

Candidates are expected to demonstrate the following in the context of the content described:

AO1 Recall, Select and Communicate

- recall, select and communicate their knowledge and understanding of a range of contexts;

AO2 Apply Skills, Knowledge and Understanding

- apply skills, knowledge and understanding, including quality standards, in a variety of contexts and to plan and carry out investigations and tasks, involving a range of tools, equipment, materials and components;

AO3 Analyse and Evaluate

- analyse and evaluate evidence, make reasoned judgements and present conclusions.

AO weightings – GCSE (Single Award)

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

Unit	% of GCSE Single Award			Total
	AO1	AO2	AO3	
Unit A621: *1A Study of an Engineered Product & 1B Engineering a Product (Controlled Assessment)*	10	40	10	60%
Unit A622: *Engineering Processes*	16	16	8	40%
	26%	56%	18%	100%

AO weightings – GCSE (Double Award)

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 A621: *1A Study of an Engineered Product & 1B Engineering a Product (Controlled Assessment)*	5	20	5	30%
Unit A622: *Engineering Processes (Examined Unit)*	8	8	4	20%
Unit A623: *3A Real World Engineering & 3B Making an Engineered Product* (*Controlled Assessment*)	5	20	5	30%
Unit A624: *Impact of Modern Technologies on Engineering (Examined Unit)*	8	7	5	20%
	26%	54%	20%	100%

4.7 Quality of Written Communication

Quality of written communication is assessed in all units

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 a suitable structure and style of writing.

5 Controlled Assessment

5.1 The Controlled Assessment Units

Unit A621 parts 1A and 1B, and A623 parts 3A and 3B 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 Scheme of Assessment sections of the units include more detail and any specific requirements.

5.2 Task Setting

5.2.1 The OCR approach

OCR will assume a high level of control in relation to the setting of tasks. A number of Controlled Assessment tasks will be available from OCR for the Controlled Assessment units. These tasks have been designed to meet the full assessment requirements of the unit. Candidates will need to take part in a planned learning programme that covers the underpinning knowledge and skills of the unit in addition to completing the evidence requirements of the designated assessment tasks.

5.2.2 Using controlled assessment tasks

Centres can choose one from a number of product-based tasks offered by OCR. See Appendix D. 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 that 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 cosmetic details, eg 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 (Appendix D) will include a section that briefly specifies the type and degree of adaptation that 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.

5.3 Task Taking

5.3.1 The OCR approach

For GCSE in Engineering OCR will assume a medium level of control. The task taking parameters will be defined for several key controls and the remainder set by centres as outlined below.

5.3.2 Definitions of the controls

(a) **Authenticity control:** Candidates will complete all work for assessment under direct teacher supervision except as outlined below. For GCSE in Engineering most, but not all, work for assessment would be under direct teacher supervision, for example, it is acceptable for some aspects of exploration to be outside the direct supervision of the teacher but the teacher must be able to authenticate the work and insist on acknowledgement and referencing of any sources used.

(b) **Feedback control:** Feedback to candidates will be encouraged but tightly defined. Within GCSE Engineering OCR expects teachers to supervise and guide candidates who are undertaking work that is internally assessed. The degree of teacher guidance in candidates' work will vary according to the kinds of work being undertaken. It should be remembered, however, that candidates are required to reach their own judgements and conclusions. When supervising tasks, teachers are expected to:

- review candidates' work, and provide advice at a general level. Teachers must not, however, provide detailed and specific advice on how the work may be improved to meet the assessment criteria;
- 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 specification requirements and can be assessed in accordance with the specified marking criteria and procedures.

(c) **Time control:** The time limit available to complete each assessment task is approximately 20 hours as specified within the controlled assessment units B231 and B233. It is suggested that 6 hours be spent on part A and 14 on part B. Tasks will be set within a broader learning programme, which will allow the acquisition of subject specific knowledge and the development of appropriate practical skills.

Controlled assessed work should be completed within the time limit and supervised and marked by the teacher. Some of the work, by its very nature, may be undertaken outside the centre, eg research work, testing, etc. But it is likely that using or applying this material will be undertaken under direct teacher supervision. With all internally assessed work, the teacher must be satisfied that the work submitted for assessment is the candidate's own work and be able to authenticate it using the specified procedure.

(d) **Collaboration control:** Candidates must complete and/or evidence all work individually. With reference to collaboration control, all assessment evidence will be provided by the individual candidate. Where group work is undertaken it is vital to be able to identify the unique individual contribution made by each candidate.

(e) **Resource control:** Candidates will need to be provided with the most appropriate materials and equipment to allow them full access to the marking criteria. For Unit A621 parts 1A and 1B and Unit A623 parts 3A and 3B basic workshop equipment will be adequate. However, the use of specialist equipment and ICT may be required to enable the candidate to produce the desired outcome. Candidates may also need access to resources and process only available outside the centre environment.

5.3.3 Quality assuring the controls

It is the responsibility of the Head of Centre to ensure that the controls set out in the specification and the individual units are imposed.

5.3.4 Completing the tasks

Candidates should be allowed sufficient time to complete all of the tasks. It is suggested that evidence is produced in several sessions, each focussing 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.

5.3.5 Presentation of work

Candidates must observe certain procedures in the production of controlled assessments.

- 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;
specification 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 as detailed in Appendix D, with each file clearly named with the unit code, centre number and candidate number.

5.4 Task Marking

5.4.1 The OCR approach

For GCSE Engineering 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 in uploaded to OCR's Repository.

5.4.2 Applying the assessment criteria

The starting point for marking the tasks is the marking criteria within each unit. These contain levels of 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 that will help to clarify the level of achievement the assessors will be looking.

5.4.3 Use of 'best fit' approach to marking grids

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

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 that fully meets that descriptor. This is work that 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 that, in most respects, meets the statement and work that 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.

Only one mark per unit will be entered. The final mark for the candidate for each unit is out of a total of 90 and is found by totalling the marks for each of the marking criteria strands.

5.4.4 Authentication

Teachers/course tutors 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/course tutor 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/course tutor 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. 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 (CCS160) provided includes a declaration for assessors to sign. It is a requirement of the QCA Common Criteria for all Qualifications that proof of authentication is received. Failure to provide centre authentication could result in candidates being penalised.

5.4.5 Internal standardisation

It is important that all internal assessors, working in Engineering, 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.

5.4.6 Moderation

- Teachers mark the tasks using the assessment criteria and guidelines provided by OCR.
- OCR moderators externally moderate the teacher's marking to ensure that the assessment criteria have been applied fairly and consistently to the national standard. On the basis of this moderation scaled adjustments may be recommended

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 that is presented to the Moderator for moderation must show how the marks have been awarded in relation to the marking criteria defined in Appendix B.

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

5.5 Minimum Requirements for Controlled Assessment

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

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

6 Technical Information

6.1 Making Unit Entries

Please note that centres must be registered with OCR in order to make any entries, including estimated entries. It is recommended that centres apply to OCR to become a registered 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/or moderator details for controlled assessments.

Candidates must be entered for either component 01 or 02. Centres must enter all of their candidates for ONE of the components. It is not possible for centres to offer both components within the same series.

It is essential that unit entry codes are quoted in all correspondence with OCR.

Unit Entry code	Component code	Submission/Examination method	Unit titles
A621	01	*OCR Repository*	*1A Study of an Engineered Product and 1B Engineering a Product*
	02	*Postal moderation*	
A622	01	*Computer-based test*	*Engineering Processes*
	02	*Paper-based test*	
A623	01	*OCR Repository*	*3A Real World Engineering and 3B Making an Engineered Product*
	02	*Postal moderation*	
A624	01	*Computer-based test*	*Impact of Modern Technologies on Engineering*
	02	*Paper-based test*	

6.2 Terminal Rules

Candidates must take at least 40% of the assessment in the same series they enter for either single award or double award qualification certification.

Units can be taken in any order as long as the terminal rules are satisfied.

6.3 Unit and Qualification Re-sits

Candidates may re-sit each unit once before entering for certification for a GCSE (Double Award) or GCSE (Single Award).

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

6.4 Making Qualification Entries

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

Candidates may enter for:

- GCSE certification (entry code J322);
- GCSE (Double Award) certification (entry code J344).

A candidate who has completed all the units required for the qualification must enter for certification in the same examination series in which the terminal rules are satisfied.

GCSE certification is available for the first time in June 2011, and each January and June thereafter.
GCSE (Double Award) certification is available for the first time in June 2011, and each January and June thereafter.

6.5 Grading

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

In unitised schemes candidates can take units across several different series provided the terminal rules are satisfied. They can also re-sit units or choose from optional units available. 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 have been set, and between different units. OCR uses uniform marks to enable this to be done.

A candidate's uniform mark is calculated from the candidate's raw marks. 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, eg 41/90.

The specification is 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
60/30%	90	81	72	63	54	45	36	27	18	0
40/20%	60	54	48	42	36	30	24	18	12	0

Candidate's uniform marks for each unit are aggregated and grades for the specification are generated on the following scales.

Qualification	Qualification Grade									
	Max Uniform Mark	A*	A	B	C	D	E	F	G	U
GCSE (Single Award)	150	135	120	105	90	75	60	45	30	0

Qualification	Max Uniform Mark	Qualification Grade															
		A*A*	A*A	AA	AB	BB	BC	CC	CD	DD	DE	EE	EF	FF	FG	GG	UU
GCSE (Double Award)	300	270	255	240	225	210	195	180	165	150	135	120	105	90	75	60	0

Awarding Grades

The written papers will have a total weighting of 40% and Controlled Assessment a weighting of 60%. A candidate's uniform mark for each paper will be combined with the uniform mark for the Controlled Assessment to give a total uniform mark for the specification. The candidate's grade will be determined by the total uniform mark.

6.6 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 (by the Enquiries about Results deadline).

Please refer to the *JCQ Post-Results Services* booklet and the *OCR Admin Guide* for further guidance about action on the release of results. Copies of the latest versions of these documents can be obtained from the OCR website.

6.7 Shelf-Life of Units

Individual unit results, prior to certification of the qualification, have a shelf-life limited only by that of the qualification.

6.8 Guided Learning Hours

GCSE (Single Award) in Engineering requires 120–140 guided learning hours in total.

GCSE (Double Award) in Engineering requires 240–280 guided learning hours in total.

6.9 Code of Practice/Subject Criteria/Common Criteria Requirements

These specifications comply in all respects with the current *GCSE, GCE, GNVQ and AEA Code of Practice* as available from the QCA website, the subject criteria for GCSE Engineering and *The Statutory Regulation of External Qualifications 2004*.

6.10 Classification Codes

Every specification is assigned a national classification code indicating the subject area to which it belongs. The classification code for this specification is 0009.

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

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

6.11 Disability Discrimination Act Information Relating to this Specification

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

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 *Regulations and Guidance Relating to Candidates who are Eligible for Adjustments in Examinations* produced 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 this specification are in line with QCA's GCSE subject criteria equalities review and are as follows:

	Yes/No	Type of assessment
Readers	Y	All written examinations
Scribes	Y	All written examinations
Practical assistants	Y	Practical assessments
Word processors	Y	All written examinations
Transcripts	Y	All written examinations
BSL signers	Y	All written examinations
Live speaker	Y	All written examinations
MQ papers	Y	All written examinations
Extra time	Y	All written examinations

We do not foresee any part of the assessment forming a barrier to any student. However, candidates with a visual impairment may find aspects of the qualification difficult. Similarly, candidates who have difficulty manipulating manually may be restricted in the range of tools, equipment and materials that they use

It is important to note that where access arrangements are permitted they must not be used in a way that undermines the integrity of the assessment. For example, practical assistants can be used to help learners set up but cannot help perform skills that are assessed, such as the ability to physically manipulate equipment in science.

6.12 Arrangements for Candidates with Particular Requirements

Candidates who are not disabled under the terms of the DDA may be eligible for access arrangements to enable them to demonstrate what they know and can do. Candidates who have been fully prepared for the assessment but who are ill at the time of the examination, or are too ill to take part of the assessment, may be eligible for special consideration. Centres should consult the *Regulations and Guidance Relating to Candidates who are Eligible for Adjustments in Examinations* produced by the Joint Council.

6.13 OCR Repository

The OCR Repository allows centres to submit moderation samples in electronic format.

The OCR GCSE Engineering units A621 and A623 can be submitted electronically to the OCR Repository via Interchange: please check Section 6.1 for unit entry codes for the OCR Repository.

More information on the OCR Repository can be found in Appendix D: Guidance for the Production of Electronic Controlled Assessment. Instructions for how to upload files to OCR using the OCR Repository can be found on OCR Interchange.

6.14 Computer-based Tests

Please use the information in Appendix C to ensure that the centre has the technical capability to administer the computer-based tests required for this specification. **Please note it is the responsibility of the Head of Centre to ensure that the centre is appropriately equipped to administer the tests in terms of system requirements and venue requirements.** The Exams Officer within the centre is responsible for the conduct of the computer-based tests within the bounds of the Instructions for the Conduct of Examinations issued by the Joint Council for Qualifications.

Any queries concerning computer-based tests should be directed to etest@ocr.org.uk.

7 Other Specification Issues

7.1 Overlap with other Qualifications

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

7.2 Progression from these Qualifications

GCSE qualifications are general qualifications that 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.

7.3 Spiritual, Moral, Ethical, Social, Legislative, Economic and Cultural Issues

These specifications offer opportunities that can contribute to an understanding of these issues as follows:

- spiritual development, through helping pupils recognise their own creativity and the creativity of others in finding solutions to problems, and through recognising the tension between material and non-material needs;
- moral development, through helping pupils to reflect on how technology affects the environment so they can make informed choices when designing and making and through discussing the moral dilemmas posed by introducing new technologies within different values systems and the advantages and disadvantages of new technology to local, national and global communities;
- social development, through helping pupils recognise the need to consider the views of others when discussing design ideas;
- cultural development, through exploring the contribution of products to the quality of life within different cultures, and through valuing and reflecting on the responses of people from other cultures to design solutions.

7.4 Sustainable Development, Health and Safety Considerations and European Developments consistent with international agreements

These specifications support these issues, consistent with current EU agreements, in the following topics:

This specification provides opportunities to promote education for sustainable development, through developing knowledge and understanding of the principles of sustainable design and production systems, developing skills in creative problem solving and evaluation, and exploring values and ethics in relation to the application of design and technology. Whereas 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 that benefits and drawbacks associated with the use of different sources of energy.

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

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

7.5 Avoidance of Bias

OCR has taken great care in preparation of these specifications and assessment materials to avoid bias of any kind.

7.6 Language

These specifications and associated assessment materials are in English only.

7.7 Key Skills

This specification provides opportunities for the development of the Key Skills of *Communication*, *Application of Number*, *Information 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		IT		WwO		IoLP		PS	
	1	2	1	2	1	2	1	2	1	2	1	2
A621:1A	✓	✓			✓	✓	✓		✓	✓		
A621:1B	✓	✓	✓	✓	✓	✓	✓		✓		✓	✓
A622	✓	✓			✓	✓	✓		✓	✓		
A623:3A	✓	✓			✓	✓	✓		✓	✓		
A623:3B	✓	✓			✓	✓	✓		✓	✓	✓	✓
A624	✓	✓	✓	✓	✓	✓	✓		✓	✓		

Detailed opportunities for generating Key Skills evidence through this specification are posted on the OCR website (www.ocr.org.uk). A summary document for Key Skills Coordinators showing ways in which opportunities for Key Skills arise within GCSE courses has been published.

7.8 ICT

In order to play a full part in modern society, candidates need to be confident and effective users of ICT. Where appropriate, candidates should be given opportunities to use ICT in order to further their study of the analysis, design and making of an engineered product.

The assessment of this course requires candidates to use ICT through preparing, presenting, and reviewing information as they work on their design ideas, developing models that communicate these ideas.

7.9 Citizenship

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

This section offers guidance on opportunities for developing knowledge, skills and understanding of citizenship issues during the course. These opportunities are also indicated within the content of:

Citizenship	Opportunities for Teaching Citizenship Issues during the Course
Consider the needs of others	Unit: A621 1A, A621 1B, A622
Consider issues surrounding a particular product and its surroundings	Unit: A621 1A, A621 1B, A622
Seek opinions of others and be flexible and adaptable in responding to their needs	Unit: A621 1B, A622
Consider the need to work together as a team	Unit: A622, A623
Seek the opinions of others	Unit: A621 1B, A622
Consider the health and safety of others	Unit: A622

Appendix A: 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 the specification; they are not designed to define that content. The grade awarded will depend in practice upon the extent to which the candidate has met the assessment objectives overall. Shortcomings in some aspects of the assessment may be balanced by better performance in others.

Grade F

Candidates recall, select and communicate knowledge and understanding of basic aspects of engineering.

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.

Grade C

Candidates recall, select and communicate sound knowledge and understanding of engineering.

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

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

Grade A

Candidates recall, select and communicate detailed knowledge and thorough understanding of engineering.

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.

Appendix B: Marking Criteria for Controlled Assessments

Please note that candidates entering Single Award Manufacturing and Single Award Engineering, and therefore studying units B231 1A and B231 1B in GCSE Manufacturing, must choose a different product from the lists given below to that selected for their manufacturing course. Under no circumstances can the same piece of work be presented for Unit B231 1A Manufacturing and Unit A621 1A Engineering. Similarly, different products must be presented for B231 1B Manufacturing and A621 1B Engineering.

Unit A621: *1A Study of an Engineered Product (Controlled Assessment)*

Candidates must select one of the following products as a starting point for the controlled assessment project, Unit A621 1A Study of an Engineered Product. When analysing the product they will need to identify two similar products that have been subsequently developed using modern technology.

1940s Bakelite telephone	1940s Bicycle	1920s Domestic oven
1940s Sewing machine	1940s Hairdryer	1920s Electric cooker
1950s Camera	1950s Milk bottle	1920s Kettle
1950s Electric toaster	1950s Radio	1940s Television
1950s Glass bottle	1990s Personal computers	1950s Washing machine
1970s Walkman		

Unit A621: *1B Engineering a Product* (*Controlled Assessment)*

Candidates must select one of the following client design briefs as a starting point for the controlled assessment project, Unit A621 1B Engineering a Product. Through investigation of the brief candidates can devise their own starting point.

- A local company has identified that there is a need for a greater choice in the market on items that are used for storage around the home.
- A local charity would like to introduce collecting boxes that can be used to collect donations from the general public.
- Car security is becoming a great concern. Devise a car alarm that could be introduced onto the market.
- The crime prevention officer has noticed an upturn in theft from houses in the area and would like to run a campaign promoting home security. He needs posters to make people aware of the situation as well as devices that can be used to deter opportunist thieves.
- In order to avoid damage to the car when driving into a garage or while it is reversing, a sensor is needed that will warn the motorist when he/she is getting near to a hazard.

- A company that specialises in security would like an alarm introduced that can be stored in a pocket or bag and used by the person as a warning device if a person was attacked.
- Mechanical toys entertain a wide variety of people from children to executives to relieve boredom. Design a new device that can be sold by a local retailer.
- A local garden centre would like to sell devices that indicate when plants need watering.
- Novelty egg timers will be introduced to a range of kitchen items sold in a local store. Explore this idea and produce a prototype that could be sold at the store.
- A cycle store would like to introduce a range of devices that can be used to attach mobile phones to cycles.
- A local hardware store has identified that there is a market for interchangeable screwdrivers. Explore this and come up with a device that can be sold in the store.
- Dentists would like to introduce a device to encourage young children to brush their teeth for a minimum of two minutes a day, twice daily. The item should appeal to younger users.
- A DIY outlet would like to add new products to its range of clamping devices that are used when carrying out jobs around the home or in the garage. Explore this situation and produce an appropriate device.
- A sports shop has identified a need for devices that can be used by fishermen to hold items while they prepare flies for future fishing sessions.
- A DIY outlet would like to add quick-action-release clamps to its range of devices that are used when carrying out jobs around the home or in the garage. Explore this situation and produce an appropriate device.
- A local company would like to produce holders that can be used by individuals while soldering components onto a printed circuit board.
- A local company would like to produce stands that can be used by individuals to hold hot soldering irons.

Unit A623: *Unit 3A Real World Engineering (Controlled Assessment)*

Candidates must select one of the following products as a starting point for the activity. Through investigating the product, candidates, working in teams, can devise their own particular starting point.

Alloy car wheels	Greenhouse	Roller bearings
Aluminium saucepan	House brick	Roller blades
Artificial limb	I Pod	Safety guards
Calculators	In-flight fuelling systems	Spectacles
Climbing frame	Kitchen cabinet	Stainless steel teapot
Computer mouse	Lamp post	Surgical appliances
Dehumidifier	Laser printer	Tumble dryer
Dental accessories	Lathes	uPVC window
Digital cameras	Lawnmower	Walking frame
Domestic iron	Mobile phone	Washing machine
Electric kettle	Mortise locks	Water pumps
Electric plug top	Motor car	Wheelbarrow
Electric toaster	Motor car engine	Wheelie bin
Electronic door locking systems	Motorbike fairing	Wristwatch
Garage doors	Petrol pumps	
Garden gate	Power drill	

Unit A623: *3B Making an Engineered Product (Controlled Assessment)*

Candidates must select one of the following products for the Controlled Assessment project, Unit A623 3B Making an Engineered Product.

Adjustable spanner	G Clamp	Shoe storage
Adjustable tent pegs	Garden hand tools	Sliding bevel
Alternative to tool box storage	Garden tool storage	Sliding coat storage
Axle stands	Hacksaw	Small sack truck
Bicycle stand	Hole punch	Soldering clamp
Camping stove	Indoor cricket stumps	Soldering iron stand
Chess set	Mechanical toy	Step stool
Climbing frame	Mobile phone holder	Storage of shot puts
Clock	Model engine	Table tennis net supports
Cricket net supports	Moisture sensor	Telescopic fishing rod support
Depth gauge – manual or electronic	Nightlight	Toolmaker's clamp
Drilling clamp	Oscillating engine	Towing alarm
Egg timer	Paper cutter	Vice
Electronic door alarm	PCB holder	Watchmaker's clamp
Engineer's tool clamp	Pill storage devise	Watering hose storage
Engineer's vice	Quick-release-action clamp	Wheel nut clamp
Executive toy	Reversing warning device	
Fly-tying vice	Rolling storage unit	
Folding golf trolley	Rotary clothes line storage	

Has basic ability	Demonstrates an ability	Works competently
For the engineered products studied the candidate:		
gives a basic description of: • the impact of modern technologies, smart materials and components on their development; • the advantages and disadvantages that the use of modern technology has brought to society. **[0 1 2 3]**	gives a description of: • the impact of modern technologies, smart materials and components on their development; • the advantages and disadvantages that the use of modern technology has brought to society. **[4 5 6]**	gives a fully detailed description of: • the impact of modern technologies, smart materials and components on their development; • the advantages and disadvantages that the use of modern technology has brought to society. **[7 8 9]**
gives a basic explanation of the use of materials and components and some of their: • properties; • characteristics; • performance; and • cost. There will be little or no use of specialist terms. Answers may be ambiguous or disorganised. Errors of spelling, punctuation and grammar may be intrusive. **[0 1 2 3]**	gives an adequate explanation of the use of materials and components and their: • properties; • characteristics; • performance; and • cost. There will be some use of specialist terms, although these may not always be used appropriately. The information will be presented for the most part in a structured format. There may be occasional errors in spelling, punctuation and grammar. **[4 5 6]**	gives a fully detailed and justified explanation of the use of materials and components and their: • properties; • characteristics; • performance; and • cost. Specialist terms will be used appropriately and correctly. The information will be presented in a structured format. The candidate can demonstrate the accurate use of spelling, punctuation and grammar. **[7 8 9]**
gives a basic explanation of the: • engineering processes used. **[0 1 2]**	gives a detailed explanation of the: • engineering processes used. **[3 4]**	gives a fully detailed and justified explanation of the: • engineering processes used. **[5 6]**
suggests, with some explanation, limited: • modifications to design solutions; • sustainability issues. **[0 1 2]**	suggests and explains: • modifications to design solutions; • sustainability issues. **[3 4]**	suggests and explains in detail: • modifications to design solutions; • sustainability issues. **[5 6]**

Has basic ability	Demonstrates an ability	Works competently
Using the client design brief for an engineered product the candidate:		
provides a basic analysis of the client brief; produces and partially applies a design specification; **[0 1 2 3]**	provides an analysis of the client brief; produces and applies a design specification; **[4 5 6]**	provides a detailed and justified analysis of the client brief; produces and fully applies a justified design specification. **[7 8 9]**
develops some design ideas using engineering drawings to current industry standards; presents their selection of design solutions for the engineered product; gives some considered client feedback; **[0 1 2 3 4 5]**	develops a range of annotated design ideas using appropriate engineering drawings to current industry standards; presents and explains their selection of design solution for the engineered product; consider client feedback and responds appropriately; **[6 7 8 9 10]**	develops a wide range of annotated design ideas using appropriate engineering drawings to current industry standards; presents and fully justifies their selection of design solution for the engineered product; considers client feedback, respond appropriately and justify changes made; **[11 12 13 14 15]**
makes a prototype of the design solution; **[0 1 2 3 4 5 6]**	makes a quality prototype of the design solution; **[7 8 9 10 11 12]**	makes a complete, high quality prototype of the design solution; **[13 14 15 16 17 18]**
selects and safely uses appropriate materials, parts and components, processes, tools and equipment; applies some quality control techniques; **[0 1 2 3]**	selects and safely uses a range of appropriate materials, parts and components, processes, tools and equipment; appropriately applies a range of quality control techniques; **[4 5 6]**	selects and safely uses a wide range of appropriate materials, parts and components, processes, tools and equipment; appropriately applies and details a range of quality control techniques; **[7 8 9]**
suggests some modifications to the design solution giving some consideration to the use of modern materials, processes and technologies. **[0 1 2 3]**	suggests modifications to the design solution giving consideration to the use of modern materials, processes and technologies. **[4 5 6]**	suggests detailed and justified modifications to the design solution giving consideration to the use of modern materials, processes and technologies. **[7 8 9]**

Has basic ability	Demonstrates an ability	Works competently
For the engineered products the candidate:		
gives a basic explanation of most stages in engineering the product; **[0 1 2]**	identifies and explains the stages in engineering the product; **[3 4]**	identifies and fully explains all the stages in engineering the product; **[5 6]**
gives a basic outline of the engineering processes and quality control techniques used to produce the product; **[0 1 2]**	identifies and explains the engineering processes and quality control techniques used to produce the product; **[3 4]**	identifies and fully explains the engineering processes and quality control techniques used to produce the product; **[5 6]**
gives limited consideration to the product with some detail of materials and components and their: • functions; • properties; and • characteristics; **[0 1 2]**	considers the identified product, giving detail of materials and components and their: • functions; • properties; and • characteristics; **[3 4]**	fully considers the identified product giving detail and justifying all materials and components and their: • functions; • properties; and • characteristics; **[5 6]**
gives a basic explanation of some of the systems and control technology, to organise, monitor and control production of the product; **[0 1 2]**	identifies and explains systems and control technology, to organise, monitor and control production of the product; **[3 4]**	identifies and fully explains systems and control technology, to organise, monitor and control production of the product; **[5 6]**
gives a basic explanation of the impact of modern technologies when engineering the product. **[0 1 2]**	identifies and explains the impact of modern technologies when engineering the product. **[3 4]**	identifies and fully explains the impact of modern technologies when engineering the product. **[5 6]**

Has basic ability	Demonstrates an ability	Works competently
For the engineering product made the candidate:		
produces and refers to a basic production plan; **[0 1 2 3 4]**	produces and applies a production plan; **[5 6 7 8]**	produces and fully applies a detailed production plan; **[9 10 11 12]**
makes a prototype of the engineered product; **[0 1 2 3 4 5 6]**	makes a quality prototype of the engineered product; **[7 8 9 10 11 12]**	makes a complete, high-quality prototype of the engineered product; **[13 14 15 16 17 18]**
selects and uses: • processes: • materials; • parts; • components; • tools; and • equipment. There will be little or no use of specialist terms. Answers may be ambiguous or disorganised. Errors of spelling, punctuation and grammar may be intrusive. **[0 1 2 3 4]**	selects, uses and explains the use of appropriate: • processes: • materials; • parts; • components; • tools; and • equipment. There will be some use of specialist terms, although these may not always be used appropriately. The information will be presented for the most part in a structured format. There may be occasional errors in spelling, punctuation and grammar. **[5 6 7 8]**	selects, uses and justifies the use of a wide range of appropriate: • processes: • materials; • parts; • components; • tools; and • equipment. Specialist terms will be used appropriately and correctly. The information will be presented in a structured format. The candidate can demonstrate the accurate use of spelling, punctuation and grammar. **[9 10 11 12]**
gives limited detail of their individual application of: • health and safety procedures; and • quality control techniques. **[0 1 2 3]**	details their individual application of: • health and safety procedures; and • quality control techniques. **[4 5 6]**	fully details their individual application of: • health and safety procedures; and • quality control techniques. **[7 8 9]**
gives some analysis and revision of the completed product, stating how or why it could be improved. **[0 1 2 3]**	analyses and revises the completed product, explaining how and why it could be improved. **[4 5 6]**	provides a detailed analysis and revision of the completed product, fully explaining how and why it could be improved. **[7 8 9]**

Appendix C: Centre Audit for Running Computer-Based Tests

Please use this information to ensure that the centre has the technical capability to administer the computer-based tests required for this specification. **Please note it is the responsibility of the Head of Centre to ensure that the centre is appropriately equipped to administer the tests in terms of system requirements and venue requirements.** The Exams Officer within the centre is responsible for the conduct of the computer-based tests within the bounds of the Instructions for the Conduct of Examinations issued by the Joint Council for Qualifications.

If there are any difficulties in completing the audit, please contact etest@ocr.org.uk.

Requirements for OCR Computer-based Tests

- *Ensure that the Head of Centre, Exams Officer, Systems Manager/Technician, subject teacher and SENCo (if appropriate) are clear about what is involved.*
- *Check that the centre can meet the technical and venue requirements.*

It is essential that all stakeholders within the examination centre plan the process for running computer-based tests carefully and methodically. The technical set up of the hardware and software is likely to take a little time and application and so should be carried out well in advance to allow for any technical issues to be resolved in good time.

Before starting teaching the specification – planning and approval

1. Agree who is to be the Test Administrator, responsible for making sure that the tests are conducted properly. The Exams Officer may fulfil this role or may delegate it to a colleague.

2. Audit the centre against the Centre Checklist. This checks that the centre is able to meet the technical eligibility requirements. The school or college Systems Manager/Technician must be part of this process.

3. Ensure that the member of staff responsible for the Centre Network is aware of the plan to use computer-based testing. Consider the implications of using computer-based testing carefully.

Before entries are made for a computer-based test – setting up

1. The Technician must ensure that the necessary hardware and software has been set up before entries are made. The set up must be done according to the instructions provided with the software.

2. The Technician installs the software according to instructions and runs all necessary diagnostic tests.

3. The Technician checks that the programs are running correctly and communicating properly with each other and the outside world.

4. The Technician checks that the software is running properly on the machines to be used for the live computer-based tests. It is important that an early decision is made on which room and equipment is to be used for the live tests.

5. Entries are made following the usual procedure, ahead of the entries deadline.

At least one month before the test date

The subject teacher and Test Administrator run a practice test for candidates so that they are familiar with the format and look of computer-based tests.

Prior to the live test

1. The Test Administrator and Technician ensure that all hardware and software is running appropriately in the room where the tests are to take place.

2. The Test Administrator and Technician ensure that they understand the process for downloading and accessing the live tests.

2. The Test Administrator checks the mouse, keyboard, screen and headphones (if required) on each candidate workstation.

On the day of the test

1. The Test Administrator runs the tests according to the instructions and within the bounds of the Instructions on the Conduct of Examinations document provided by Joint Council for Qualifications.

2. The Test Administrator uploads candidates' responses according to the instructions.

CENTRE CHECKLIST FOR RUNNING COMPUTER-BASED TESTS

Technical Requirements	
Minimum Requirements for each Candidate Computer	
Processor speed	1.0 GHz
Memory (RAM)	128 MB RAM (256 MB recommended)
Hard disk space	At least 250 MB of available hard disk space
Operating system	Windows XP/2000/2003
Browser	Internet Explorer 6 (or above)
Display	High colour 32 bit display or better. Resolution 1024 x 768
	Mouse Re-writeable CD or DVD drive 16-bit soundcard Headphones with adjustable volume for candidates requiring a reader or taking a test involving audio
Admin rights	PC/Network Administration rights for installation
Protocols supported	TCP/IP
Player	Flash Player version 8
Minimum Requirements for Test Administrator Computer (as above plus)	
Processor speed	1.0 GHz
Memory (RAM)	512 MB RAM
Hard disk space	At least 1.5 GB of available hard disk space
Adobe application	Adobe Acrobat reader installed
Printer	Connection to a printer
Minimum Server Requirements	
Processor speed	1.7 GHz or above (single CPU Server) 1.2 GHz or above (multiple CPU or dual core CPU Server)
Memory (RAM)	512 MB RAM
Hard disk space	Minimum 2 GB free space
Operating system	Windows 2000 Server (Service Pack 4 or later) Windows 2003 Server** Windows 2003 Server Release 2**
Network Infrastructure Guidelines	
Network connection	1 GB LAN interface card
Cabling	Category 5/5e/6 UTP Cabling
Server connection speed	1 GB server connection
Workstation connection	Switched 100 Mbps connection recommended
Connection sharing	Shared 100 Mbps connections if necessary but a maximum of 24 users per switch feed. Hubs, where used, should not be cascaded

Administration Requirements
Workstation Requirements
Capacity for a minimum of seven candidates (8 PCs)
A spare capacity of one workstation for every seven
One workstation within the same room as the candidate workstations to run administrative functions
Test Room Requirements
A quiet room or rooms, free from distractions and interruptions
A room or rooms and equipment dedicated to the test during the session
Good lighting, without disruptive glare on screens
Proper ventilation and heating (where necessary)
Walls free from display material
Appropriate furnishing to give candidates maximum comfort
Adjustable chairs
Adequate space at each workstation to allow candidates to take notes
Secure workstations. Seating arrangements should prevent candidates from being able to see a fellow candidate's screen. The minimum distance between the outer edge of one screen and the next should be 1.25 metres, unless the monitors are positioned back to back or separated by dividers high enough to prevent other candidates from overlooking the work of others. In this case, the minimum distance need not apply. However, if the screens are diagonally opposite and not separated by dividers, 1.25 metres may not be sufficient. The principal objective is to ensure that no candidate's work can be overseen by others, and Exams Officers must take appropriate steps to ensure that this can be achieved.
A clock or clocks in the room visible to all candidates, or the provision of alternative arrangements
A means of summoning assistance (eg phone) and support contact details available in the test room for emergencies
Disabled access to the test room and to workstations, or the provision of alternative arrangements, eg a ground floor room.
Facilities for registration and ID checking
Requirements Outside the Test Room
None
Administrative Personnel
An Exams Officer who will be available during all OCR CBT live sessions.
A minimum of one invigilator per room for each session. If there are more than 25 candidates in a room, there should be a further ratio of one invigilator to every 25 candidates.
The Exams Officer and invigilator must be familiar with the emergency procedures for the test venue.

OCR computer-based tests will normally be administered at the centre, providing the centre has a venue that meets the following technical criteria, **or can be run at an external test venue** where authorisation has been given by OCR, for example where a candidate is in hospital on the day of the examination. An external test venue may be an appropriate multimedia room at a school or college or other venue suitable for computer-based testing but must meet the same technical criteria. The venue must have technical support personnel who will be available for during all OCR computer-based tests live sessions.

Appendix D: Guidance for the Production of Electronic Controlled Assessment

The materials produced for Controlled Assessment in units A621 and A621 form a Controlled Assessment portfolio, stored electronically.

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 code (A621 or A623), so that the portfolio is clearly identified as the work of one candidate.

Each candidate produces evidence for the Controlled Assessment. The evidence for each element should be contained within a separate folder within the portfolio. Each of these folders is likely to contain separate files.

Each candidate's Controlled Assessment portfolio should be stored in a secure area on the centre 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.

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)
Microsoft Office suite
PowerPoint (.ppt)
Word (.doc)
Excel (.xls)
Visio (.vsd)
Project (.mpp)
Text formats
Comma Separated Values (.csv)
PDF (.pdf)
Rich text format (.rtf)
Text document (.txt)