OCR RECOGNISING ACHIEVEMENT

Principal Learning

Engineering

OCR Level 3 Principal Learning in Engineering H811

Centre Handbook/Specification

Principal Learning handbook/specification

Contents

Contents

1   Introduction

This centre handbook/specification provides information for centre staff involved in the planning, delivery, assessment or moderation of the following qualification which has been accredited onto the National Qualifications Framework (NQF) at Level 3 and is part of the OCR Principal Learning suite of qualifications:

H811 OCR Level 3 Principal Learning in Engineering

This qualification is a component of the Level 3 Advanced Diploma in Engineering and the Level 3 Progression Diploma in Engineering but it is also available as a 'stand-alone' qualification. For more information on the Diploma see section 12 of this centre handbook.

It is important that all centre staff involved in the delivery, assessment or moderation of the above principal learning qualification understand the requirements laid down in this handbook and have access to this publication.

An electronic copy of this centre handbook is available to download free of charge from our website www.ocr.org.uk .

1.1   Documentation updates

The information provided in this centre handbook was correct at the time of production. Occasionally OCR may update this information. Please refer to the updates section of the relevant qualification on our website www.ocr.org.uk for details regarding amendments made to this handbook. For your convenience, the latest version of this handbook is available electronically for downloading from the OCR website.

1.2   Principal Learning suite of qualifications

The Principal Learning suite of qualifications provides learners with employer led qualifications geared to the specific knowledge and skill requirements of key sectors. Learners will learn by doing – in contexts appropriate to the sector studied. Tasks set will be relevant to the real world of work. These are attractive, work-related qualifications which intend to stimulate and interest learners.

Principal Learning qualifications are being developed in four phases and will be available in 17 sectors by 2011:

- IT (from 2008)

- Society, health and development (from 2008)

- Creative and media (from 2008)

- Engineering (from 2008)

- Construction and the built environment (from 2008)

- Environmental and land-based studies (from 2009)

- Business, administration and finance (from 2009)

- Hair and beauty (from 2009)

- Hospitality (from 2009)

- Manufacturing and product design (from 2009)

- Public services (from 2010)

- Retail business (from 2010)

- Sport and active leisure (from 2010)

- Travel and tourism (from 2010)

- Humanities (from 2011)

- Languages (from 2011)

- Science (from 2011)

1.3   Administration arrangements for this qualification

A separate publication, the *OCR Admin Guide (14-19 Qualifications)* will provide full details of the administration arrangements for this qualification. Full administrative arrangements are currently being developed and will be issued to all approved centres. These will also be published on the OCR website.

1.4   If centre staff have queries

This Centre Handbook and the *OCR Admin Guide (14-19 Qualifications)* contain all the information needed to deliver, assess, moderate and administer these qualifications. If centre staff have any queries about these qualifications that are not answered in these publications, they should refer to section 10 for details of who to contact for further support.

2 Principal Learning – an overview

2.1 Key features of Principal Learning

Principal Learning is both a mandatory part of the Diploma and a qualification in its own right (see section 12 of this centre handbook for information on the Diploma.)

All learning must be sector related and current – teaching and learning must draw on up-to-date developments in the sector.

A minimum of 50% of all learning must be applied ie knowledge and skills must be set within the contexts of tasks, problems and situations that are related to work in the sector.

All units are mandatory and two units are externally assessed (see section 5 see section 5 of this centre handbook)

Generic skills can be developed and applied through Principal Learning.

The assessment of personal, learning and thinking skills (PLTS) must be integrated into Principal Learning.

2.1.1 Themes

The OCR qualification is based on the criteria for principal learning in engineering as set out in *Criteria for the specialised Diploma qualifications in engineering at levels 1, 2 and 3 (November 2006)* which were developed by the Diploma Development Partnership (DDP) for engineering. The criteria set out the knowledge, understanding and skills required of learners who wish to achieve a diploma qualification. These requirements are presented as themes and topics. The Level 3 Principal Learning in Engineering comprises four themes as follows:

Themes and topics
Theme A: The engineered world
Topic 1: Engineering businesses and the environment
Theme B: Discovering engineering technology
Topic 2: Applications of computer aided designing
Topic 3: Selection and application of engineering materials
Topic 4: Instrumentation and control engineering
Topic 5: Maintaining engineering systems and products
Topic 6: Production and manufacturing

Theme C: Engineering the future
Topic 7: Innovative design and enterprise
Theme D: Analytical methods for engineering
Topic 8: Mathematical techniques and applications for engineers
Topic 9: Scientific principles and applications for engineers

2.2   Structure and size of Principal Learning

OCR Level 3 Principal Learning comprises nine units and to achieve the qualification the learner must complete all nine units which are equivalent to the nine topics listed above .

2.2.1   Guided learning hours

Each of the units in Principal Learning is allocated an approximate number of guided learning hours (glh), details are given in the table below. These hours indicate the approximate number of 'teacher supervised or directed study time and do not include any self directed study time that may be required by the learner' (QCA, April 2007).

OCR Level 3 Principal Learning in Engineering has a total of 540 guided learning hours (glh).

2.2.2   OCR Units

The units in the OCR Level 3 Principal Learning in Engineering are:

OCR Unit Entry Code*	Unit title	GLH	Form of assessment	QCA unit accreditation code
F556	Engineering businesses and the environment	60	Internally assessed	H/501/1897
F557	Applications of computer aided designing	60	Internally assessed	K/501/1898
F558	Selection and application of engineering materials	60	Internally assessed	M/501/1899
F559	Instrumentation and control engineering	60	Externally assessed	Y/501/1900
F560	Maintaining engineering systems	30	Internally assessed	D/501/1901
F561	Production and manufacturing	60	Internally assessed	H/501/1902
F562	Innovative design and enterprise	60	Internally assessed	K/501/1903

F563	Mathematical techniques and applications for engineers	60	Externally assessed	M/501/1904
F564	Scientific principles and applications for engineers	90	Internally assessed	T/501/1905

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

2.3 Applied learning

At the heart of Principal Learning is 'learning by doing'. At least 50% of Principal Learning has to be applied. It must be 'concerned with the application of knowledge and skills through relevant work and work-related tasks, problems and contexts' (QCA, April 2007). This means that learning must be in a work-related environment, whether real or simulated.

Applied learning is the practical application of theory that allows learners the opportunity to actively engage with the curriculum they are studying. It is relevant and meaningful to learners as it allows for learning within different contexts and environments. Applied learning allows the learner to interact with teachers, other learners and individuals from outside the classroom.

Applied learning encourages:

- linking understanding and learning activities to job roles

- interaction with professionals

- real life investigations and active enquiry

- learning through doing

- interaction with other learners through group work

- learning in different environments.

Fundamental to applied learning is employer engagement, work experience and learning by doing.

2.3.1 Employer engagement

Employer engagement means involving employers in developing the skills of 14 to 19 year olds through their schools and colleges. 'Employers' does not only mean business people, but also the public and voluntary sector. Employers can be engaged at local, regional or national level, either by approaching an appropriate organisation at strategic level or a specific known individual.

Clearly a whole school/college approach to employer engagement will reap maximum rewards.

Employer engagement could be developed by:

- recruiting non teaching members of staff to provide sector specific knowledge, understanding and skills

- a marketing campaign to parents – to ask for sector expertise/support

- developing school/college based businesses

- using staff and students during work experience to act as ambassadors to recruit employers

- developing a professional development programme where staff meet lots of local employers

- develop long-term partnerships with local companies to develop staff eg mentoring coaching

- have departmental/faculty targets for employer engagement.

An employer can be asked to:

- take part in a mock interview

- act as a customer in role plays

- judge a competition

- provide work shadowing opportunities (for staff and/or learners)

- provide a tour of their organisation

- be a guest speaker

- offer personal professional development to staff

- act as an enterprise adviser

- act as a business mentor

- act as a class adviser

- aid curriculum development

- offer work experience

- offer an extended work placement

- allow participation in in-company training programmes.

2.3.2 Work experience

Work experience is an important and essential feature of the Diploma, but is not a requirement for Principal Learning. A centre may choose to offer work experience to their learners as a matter of best practice, exposing the learner to sector activities and maximising the opportunities for applied learning. Learners could use their work experience to gather evidence for Principal Learning units.

For the Diploma a minimum of 10 days work experience is required and will enrich the Principal Learning programme, offering opportunities to develop and demonstrate the skills and knowledge in the units. Work experience does not need to be undertaken in any specific sector although it should support work related learning, provide opportunity for the collection of evidence, enhance the learning experience and support the development of both sector specific and employability skills. Work experience should provide a valuable opportunity for the learner to develop the personal, learning and thinking skills particularly those PLTS that are not embedded or explicit within the Principal Learning.

The context of much of the work/many of the units will require the learner experiencing events and work alongside people in an engineering sector. Wherever possible this should be a genuine experience, however, it is recognised that for a number of reasons situations may need to be simulated within an appropriate environment. For example in unit 6 the learner is required to investigate different manufacturing systems and develop a knowledge and understanding of different types of manufacturing processes, assembly systems and finishing techniques. Ideally this would be best carried out within an engineering company.

2.3.3 Learning by doing

Applied learning must be embedded into both teaching and assessment. Examples of suitable activities that could take place within a school/college environment and might include:

- role play

- planning and running an engineering activity

- designing and running a product batch assembly line

- carrying out experiments

- designing a product

- creating a product

- testing materials

- doing finances for product costing and development

- creating guidance materials

- maintaining equipment

- working with tools and equipment

- drawing conclusions from collected evidence

- organising a process

- applying mathematics in a variety of engineering contexts.

2.3.4   Legislation and procedures

Centres must ensure that they have in place robust policies and procedures in respect of work experience, visits and all contact with employers. Requirements will vary according to Local Authority policies, the sector and specific organisations involved. However insurance issues, permission from parents, risk assessments and sector specific requirements (eg police checks) must be addressed.

2.4   Personal, learning and thinking skills

Personal, learning and thinking skills are necessary for work and for general learning. A framework has been developed for describing personal, learning and thinking skills (PLTS) that applies to all young people aged 11-19. The skills are incorporated within the Diploma (they are a key feature of Principal Learning) so that they form an integral part of teaching and learning.

The aims of the Diploma mean that young people should become successful learners, confident individuals and responsible citizens. The development of PLTS is an essential part of meeting these aims. PLTS have considerable impact on young people's ability to enter work and adult life as confident and capable individuals who can make a positive contribution.

The PLTS framework comprises six groups of skills:

- independent enquirers

- creative thinkers

- reflective learners

- team workers

- self-managers

- effective participators.

These generic skills, together with the functional skills of English, mathematics and ICT, are essential to success in life, learning and work.

Each of the six skills has a detailed set of outcomes* (see below) that are indicative of the skills, behaviours and personal qualities associated with each. Each group of skills is distinctive and coherent.

All six PLTS will be developed and applied via Principal Learning. The PLTS have been embedded into the assessment criteria for Principal Learning and, therefore, they will naturally be developed and assessed as part of the programme of delivery and assessment. The PLTS occur naturally no matter what the local or sector context in which the learner is learning and being assessed.

PLTS are not assessed by OCR.

Results will be submitted by centres to the Diploma Aggregation Service. For further information please see QCA's website www.qca.org.uk.

For learners who have entered on to a Diploma programme, 60 glh are allocated to developing, planning and reviewing the application of PLTS. Learners may also develop and apply the PLTS though the project/extended project and/or work experience.

An indication of opportunities to develop and apply PLTS is signposted within the assessment criteria (using a reference code, the table below explains the code) and Section 7 in this centre handbook contains a summary of where these opportunities exist across all units.

Independent enquirers

Focus: Young people process and evaluate information in their investigations, planning what to do and how to go about it. They take informed and well reasoned decisions, recognising that others have different beliefs and attitudes.

Young people:	OCR Ref
Identify questions to answer and problems to resolve	IE1
Plan and carryout research, appreciating the consequences of decisions	IE2
Explore issues, events or problems from different perspectives	IE3
Analyse and evaluate information, judging its relevance and value	IE4
Consider the influence of circumstances, beliefs and feelings on decisions and events	IE5
Support conclusions, using reasoned arguments and evidence	IE6

Creative thinkers

Focus: Young people think creatively by generating and exploring ideas, making original connections. They try different ways to tackle a problem, working with others to find imaginative solutions and outcomes that are of value.

Young people:	OCR Ref
Generate ideas and explore possibilities	CT1
Ask questions to extend their thinking	CT2
Connect own and others' ideas and experiences in inventive ways	CT3
Question own and others' assumptions	CT4
Try out alternatives or new solutions and follow ideas through	CT5
Adapt ideas as circumstances change	CT6

Reflective learners

Focus: Young people evaluate their strengths and limitations, setting themselves realistic goals with criteria for success. They monitor their own performance and progress, inviting feedback from others and making changes to further their learning.

Young people:	OCR Ref
• Assess themselves and others, identifying opportunities and achievements	RL1
• Set goals with success criteria for their development and work	RL2
• Review progress, acting on the outcomes	RL3
• Invite feedback and deal positively with praise, setbacks and criticism	RL4
• Evaluate experiences and learning to inform future progress	RL5
• Communicate their learning in relevant ways for different audiences	RL6

Team workers

Focus: Young people work confidently with others, adapting to different contexts and taking responsibility for their own part. They listen to and take account of different views. They form trusting relationships, resolving issues to reach agreed outcomes.

Young people:	OCR Ref
• Co-operate with others to work towards common goals	TW1
• Reach agreements, managing discussions to achieve results	TW2
• Adapt behaviour to suit different roles and situations	TW3
• Show fairness and consideration to others	TW4
• Take responsibility, showing confidence in themselves and their contribution	TW5
• Provide, constructive support and feedback to others	TW6

Self-managers

Focus: Young people organise themselves, showing personal responsibility, initiative, creativity and enterprise with a commitment to learning and self-improvement. They actively embrace change, respond positively to new priorities, coping with challenges and looking for opportunities.

Young people:	OCR Ref
• Seek out challenges or new responsibilities and show flexibility when priorities change	SM1
• Work towards goals, showing initiative, commitment and perseverance	SM2
• Organise time and resources, prioritising actions	SM3
• Anticipate, take and manage risks	SM4

- Deal with competing pressures, including personal and work-related demands   SM5

- Respond positively to change, seeking advice and support when needed   SM6

Effective participators

Focus: Young people actively engage with issues that effect them and those around them. They play a full part in the life of their school, college, workplace or wider community by taking responsible action to bring improvements for others as well as themselves

Young people: OCR Ref

- Discuss issues of concern, seeking resolution where needed   EP1

- Present a persuasive case for action   EP2

- Propose practical ways forward, breaking these down into manageable steps   EP3

- Identify improvements that would benefit others as well as themselves   EP4

- Try to influence others, negotiating and balancing diverse views to reach workable solutions   EP5

- Act as an advocate for views and beliefs that may differ from their own   EP6

(*Since this qualification has been accredited by QCA the outcome statements have been revised resulting in changes to an existing statement and the addition of a new one. The revised PLTS were published in October 2007 but there was no requirement to embed the changes into any Principal Learning qualifications that were accredited prior to that. This qualification is included in that category.)

2.5   Functional skills

'Functional skills: essential for life, learning and work. Functional skills are practical skills in English, mathematics and information and communication technology (ICT). They help you gain the most out of work, education and everyday life' (QCA 2007).

Functional skills qualifications will be an integral part of the Diplomas and learners will have opportunities to develop and apply functional skills across the Diploma curriculum. All Diplomas will include generic learning – learners will develop and apply the skills and knowledge necessary for learning, employment and personal development. The functional skills will be a mandatory part of generic learning.

Diplomas will require learners to achieve functional skills:

- at level 1 for Diplomas at level 1

- at level 2 for Diplomas at levels 2 and 3.

Whilst the functional skills are a mandatory part of the Diploma, their achievement is not a compulsory part of the Principal Learning.

Guidance on the full range of opportunities for developing and applying functional skills within a sector specific context are indicated in each unit of principal learning. This will help the integration of functional skills and help learners to plan and review their achievements. These opportunities are also signposted in section 7.

2.6   Unit format

The information contained in each unit is structured in the same way. This will help centre staff and learners to understand fully the requirements of these qualifications. Each unit contains 11 distinct sections. Some cover mandatory requirements, others provide advice and guidance. The 11 sections are described below.

For the full unit specifications see section 3 of this centre handbook.

Unit level

This section indicates whether the unit is at level 1, 2 or 3 on the National Qualifications Framework.

Unit size

This section describes the aims and purpose of the unit.

Unit overview

This section provides an overview of the unit. The unit requirements contained within the following sections are introduced.

Learning outcomes

This section indicates the learning outcomes that a learner will achieve when meeting the assessment criteria associated with the unit.

Assessment criteria

This section indicates the criteria that a learner will be assessed against.

For internally assessed units, it is a mandatory requirement of this qualification that the learner provides evidence of their skills, knowledge and understanding in relation to each assessment criterion. For externally assessed units the learner's skills, knowledge and understanding will be assessed through an examination.

Personal, learning and thinking skills have been integrated into the assessment criteria and opportunities to develop and apply them are signposted.

Evidence generated for Principal Learning may also provide opportunities to develop functional skills and these opportunities are also signposted.

Exemplification

This section indicates what needs to be taught to prepare the learner for assessment. It provides guidance about the underpinning knowledge, understanding and/or skills which the learner will need in order to be able to undertake the assessment for the unit and to meet the requirements of the assessment criteria.

The introductory text gives an outline of what should be taught and the bulleted points suggest possible ways of achieving that requirement.

Form of assessment

This section indicates whether the unit will be internally or externally assessed. It specifies the mandatory requirements in relation to the assessment of the unit.

Marking criteria

This section confirms the number of marks available for the unit and **for internally assessed units** it indicates the marking criteria in three bands. Each band states the quality of evidence a learner needs to provide in order to meet the band specified. It also indicates how marks are allocated between assessment criteria and bands.

Approaches to applied learning and assessment

This section provides additional guidance for tutors on the variety of methods that can be used to apply knowledge, understanding and skills both through a range of learning strategies and assessment techniques. These vary from individual activities, such as learning to use tools and equipment safely, through to group activities such as video presentations and work place visits.

For Level 3 this will include practical research with report, 2D and 3D Cad models of design ideas, manufacturing fully functioning products, assignments with practical testing and system diagrams and data analysis.

Functional skills

This section signposts where there may be opportunities within the unit for the learner to develop and apply functional skills.

Personal, learning and thinking skills

This section summarises which of the PLTS the learner can develop and apply while undertaking the unit.

3   Units

OCR Unit Entry Code	Unit title	GLH	Form of assessment	QCA unit accreditation code
F556	Engineering businesses and the environment	60	Internally assessed	H/501/1897
F557	Applications of computer aided designing	60	Internally assessed	K/501/1898
F558	Selection and application of engineering materials	60	Internally assessed	M/501/1899
F559	Instrumentation and control engineering	60	Externally assessed	Y/501/1900
F560	Maintaining engineering systems	30	Internally assessed	D/501/1901
F561	Production and manufacturing	60	Internally assessed	H/501/1902
F562	Innovative design and enterprise	60	Internally assessed	K/501/1903
F563	Mathematical techniques and applications for engineers	60	Externally assessed	M/501/1904
F564	Scientific principles and applications for engineers	90	Internally assessed	T/501/1905

For a copy of each unit please visit our website www.ocr.org.uk (use key search word 'Diploma' then follow the links to Engineering Level 3. The units can be downloaded free of charge.

4   General Information

4.1   Profile of Principal Learning

Title	OCR Level 3 Principal Learning in Engineering			
OCR qualification code	H811			
Level	This qualification has been accredited onto the National Qualifications Framework (NQF) at Level 3.			
QAN	500/2400/0 (Qualification Accreditation Number)			
Age group approved	Pre-16	16-18	18+	19+
	✓	✓	✓	✓
This qualification is suitable for	• Learners studying in preparation for employment in the engineering sector • Learners wishing to gain a Level 3 qualification to support further study in Further Education (FE) and Higher Education (HE) in the engineering sector • Learners wishing to gain a Level 3 qualification to support further study in FE and HE in any other sector or subject area.			
Entry requirements	There are no formal entry requirements for this qualification.			
Qualification structure	Please refer to section 2.2. To achieve this qualification, learners must complete all units.			
Internal assessment	Most units are centre-assessed and externally moderated by OCR. Learners may complete these units at a time that suits the centre.			
External assessment	Unit F559 Instrumentation and control engineering and Unit F563 Mathematical techniques and applications for engineers are externally assessed (see section 5 for further details)			
Grading	The qualification is graded A* - E Units are graded as a* - e			
Funding	For information on funding please contact your local education authority			
Performance figures	Information not yet available			
PLTS	Mapping to personal, learning and thinking skills is provided within this Handbook. See section 7			
Functional Skills	Signposting to functional skills is provided within this Handbook. See section 7.			
Last session date**	June 2013		**Revised date:**	

**OCR will inform centres of changes to these dates. All centre records must be updated accordingly.

4.2   Target audience

This qualification is typically (although not exclusively) aimed at young people aged 14 to 19 in full-time education who wish to develop and apply their knowledge, understanding and skills in the context of the engineering sector and at Level 3 of the National Qualifications Framework (NQF).

More mature learners wishing to undertake a course that prepares them for further learning or work involving engineering sector related activities are equally served by these qualifications.

4.3   Entry requirements

This qualification is available to anyone who is capable of reaching the required standards. They have been developed free from any barriers that restrict access or progression thereby supporting equality and diversity.

All centre staff involved in the assessment or delivery of this qualification should understand their requirements and match them to the needs and capabilities of individual learners before entering them as learners for Principal Learning. There is no requirement for learners to achieve any qualification before progressing onto Principal Learning although, as a general guide, learners with qualification profiles comparable to Level 2 of the National Qualifications Framework (NQF) will normally be at a level suitable for entry onto a programme leading to this qualification. Individuals should be considered equally for entry whether they hold certificates easily recognisable against the NQF or present more varied profiles for consideration.

4.4   Progression opportunities

Principal Learning is designed to enable learners to either enter employment within a wide range of engineering environments, or to develop the skills, knowledge and understanding required to enable progression to qualifications along the vertical and horizontal planes in the National Qualifications Framework.

For example, a learner achieving an OCR Level 3 Principal Learning in Engineering may:

- enter employment at an appropriate level, or a job with higher level training, in sectors such as: automotive, chemicals, oils, gas, utilities, transport, science, manufacturing, engineering or building services. A Diploma gives learners relevant transferable skills that will be welcomed by employers, colleges and universities.

- enter employment and undertake a related NVQ at a level appropriate to the job role, eg NVQ Occupational Health and Safety,

- enter employment and undertake other related occupational qualifications.

- undertake additional Level 3 qualifications part-time or full-time in further education, eg AS/A Level GCE, GCE in Mathematics

- undertake additional Level 4 qualifications part-time or full-time in further education, eg OCR OCR Level 4 NVQ in Occupational Health and Safety Practice

- progress onto the full Diploma qualification (see section 12 of this centre handbook for more details on the Diploma). It is recommended that learners who complete Level 3 Diploma, and who wish to go into higher education to follow an engineering degree, should complete the additional specialist learning qualification OCR Level 3 Certificate in Mathematics for Engineers.

4.5   Supporting OCR learners

Assessors/teachers (or other centre staff) should provide guidance to learners on the assessment process and help learners prepare for assessment, full details on how the units are assessed are in sections 5 and 6 of this centre handbook.

Centres should ensure that learners are informed of the title of the qualification they have been entered for and that OCR is the awarding body for their chosen qualification.

4.6   Wider issues

This qualification provides potential for centres to develop learners' understanding of spiritual, moral, ethical, legislative, economic, social and cultural issues and heighten their awareness of sustainable development, health and safety considerations and European developments consistent with international agreements.

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

Teachers and tutors delivering Principal Learning in Engineering that supports this specification would have opportunities to address spiritual, moral, ethical, legislative, economic, social and cultural issues throughout all units in the exploration of issues such as: individual responsibility, group/team responsibility, business' social responsibilities, individual responsibilities towards the customer, courtesy and protocols in dealing with colleagues, security and confidentiality of information.

Units F556, F557, F560 and F562 provide opportunities to address these issues

Environmental issues, health and safety considerations and European developments

Teachers and tutors delivering Principal Learning in Engineering that supports this specification would have opportunities to address health and safety issues through Units F556, F558, F562 and

F564. The issue of safe working practice should be explored through the contexts of teamwork, maintaining one's own work environment and working with procedures.

Environmental issues could be explored in Units F556, F560 and F562.

European developments could be explored in Units F556 and F562

Sustainable development could be explored in Units F556, F560 and F562.

4.7   Language

The specification and associated materials are in English only.

4.8   Mode of delivery

OCR does not specify the mode of study or specify a time limit for the achievement of this qualification other than the expiry dates for entry and certification laid down by the regulatory authorities and detailed in the qualification profile of this centre handbook (section 4.1).

Centres are free to deliver this qualification using any mode of delivery that meets the needs of their learners. Whatever mode of delivery is used, centres must ensure that learners have appropriate access to the resources appropriate to the task and as required by the unit.

Centres should consider the learners' complete learning experience when designing learning programmes. This is particularly important in relation to learners studying part time alongside real work commitments where they may bring with them a wealth of experience that should be utilised to maximum effect by tutors, teachers and assessors.

4.9   Resources

Centres may find the following list of resources helpful when preparing to deliver the learning and assessment programme. Their use is not compulsory.

WEB SITES[1]
http://www.technologystudent.com/
http://www.gcseinengineering.com/GCSEinEng.nsf/Home?OpenPage
http://www.schoolsmarine.com/
http://www.helenhudspith.com/
http://www.tep.org.uk/
http://www.bbc.co.uk/schools/gcsebitesize/
http://www.bbc.co.uk/schools/gcsebitesize/hotlinks/design.shtml

---

[1] OCR is not responsible for the content of external websites.

SUBJECT: MATERIALS:

Title   Materials For The Engineering Technician (4th Ed)
Author   R A Higgins
Publisher   Newnes
ISBN   0-7506-6850-4

CD-ROM - Material Selection And Processing \ Product Analysis Tutorial And Case Studies \ Teacher Support Booklet
Authors   A M Lovatt, H R Shircliff and P J Withers
Available from: TEP on their website www.tep.org.uk [2]

Title   Advanced Design And Technology (3rd Ed)
Authors   E Norman, J Cubitt, S Urry and M Whittaker
Publisher   Longmans
ISBN   0-582-32831-4

Title   OCR Design and Technology For A Level (expected release in June 2008)
Authors   J Grundy, D Hallam, M Hopkinson, and S McCarthy
Publisher   Hodder Education
ISBN   978 0340 96634 1

Title   Advanced Manufacturing Design & Technology: Student's Book (Royal College of Art Schools Technology Project)
Authors   D Perry, L Davies, T Booth and J Sage
Publisher   Hodder & Stoughton Ltd
ISBN   0-340-70528-0

SUBJECT: SUSTAINABILITY

Title   The Sustainability Handbook For D&T Teachers
Author   I Capewell
Publisher   Practical Action Publishing
ISBN   978 1 85339 670 0

Title   The Eco Design Handbook
Author   A Fuad-Luke
Publisher   Thames & Hudson Ltd
ISBN   0-500-28521-7

SUBJECT: ELECTRONICS

Title   Electronics for Today and Tomorrow
Author   T Duncan
Publisher   John Murray
ISBN   0-7195-4183-2

SUBJECT: ENGINEERING
Title   Engineering GCSE (Levels 1 and 2)
Author   Mike Tooley
Publisher   Newnes
ISBN   0-7506-6576-9

SUBJECT: MANUFACTURING
Title   Manufacturing GCSE (Levels 1 and 2)
Author   Steve Wallis and Neil Godfrey,

---

[2] OCR is not responsible for the content of external websites

Publisher   Nelson Thornes
ISBN   0-7487-9374-7

SUBJECT: MATHEMATICS

Title   BTEC National Mathematics for Technicians (Levels 1 and 2)
Author   Graham Taylor, Alan Fuller and Alex Greer
Publisher   Nelson Thornes
ISBN   0-7487-7949-3

Title   BTEC National Further Mathematics for Technicians (Level 3)
Author   G W Taylor and Alex Greer
Publisher   Nelson Thornes
ISBN   0-7487-9410-7

SUBJECT: DESIGN & TECHNOLOGY

Title   KS3 Design and Technology Dictionary (Levels 1,2 and 3)
Author   Peter Bull
Publisher   Letts
ISBN   1-84085-999-7

ENGINEERING TEACHER AND TRAINER RESOURCES
QIA/BDP Learning - logon to the QIA website (www.qia.org.uk) and register under the Excellence Gateway tab.

Engineering National Teaching and Learning Change Programme
http://ntlcp.qia.org.uk/

4.10 Access arrangements and special consideration

For learners who may require access arrangements, pre-examination adjustments primarily based on a history of need and a history of provision, teachers should consult the JCQ publication *Regulations and Guidance Relating to Candidates who are Eligible for Adjustments in Examinations* www.jcq.org.uk . This document should also be referred to for those learners who may require a post examination adjustment, special consideration, to reflect temporary illness, indisposition or injury at the time of the examination/assessment.

4.11 Funding

The Department for Children, Schools and Families website includes information on funding for Diplomas. Please refer to their website www.dcsf.gov.uk and use the key search word '14 to 19 Funding' or follow the links on the home page to 'funding'. Alternatively, you should contact your local education authority.

4.12 Enquiries about results

Under certain circumstances, a centre may wish to query the result issued to one or more learner. Enquiries about results 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 (14-19 Qualifications)* 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.

4.13 Centre malpractice guidance

It is the responsibility of the Head of Centre to report (in writing) all cases of suspected malpractice involving centre staff or learners, to OCR.

When asked to do so by OCR, Heads of Centres are required to investigate instances of malpractice promptly, and report the outcomes to OCR.

For more details, please see the JCQ publication *Suspected Malpractice in Examinations and Assessments*, together with the OCR *Malpractice Procedures – A guide for Centres*, available from the OCR website.

4.14 Disability Discrimination Act

The Principal Learning qualification and the line of learning criteria have been reviewed to identify whether any of the competences required by the subject present a barrier to learners with a disability. Where this was the case, such competences were included only where essential to the subject.

Reasonable adjustments may be made for learners with a disability in order to enable them to access assessments and to demonstrate what they know and can do. Centres are encouraged to consider very carefully any choices available, so that they select options at the beginning of the course which may best accommodate the learner's needs. They should also consider how the learner will be able to meet the competence standards being tested. Information on access arrangements and reasonable adjustments can be found in the *Regulations and Guidance Relating to Candidates who are Eligible for Adjustments in Examinations* produced by the Joint Council (www.jcq.org.uk).

Learners who are still unable to access a significant 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.

5 External Assessment

5.1 The externally assessed units

There are two units that are externally assessed in this qualification:

Unit F559   Instrumentation and control engineering
Unit F563   Mathematical techniques and applications for engineers

5.2 Form of assessment

Full details of the form of assessment are included in the units. The unit assessment will cover all the assessment criteria for the unit. The assessment is externally set and marked.

Unit F559 is assessed via a written examination, requiring short and extended answer responses.

Length of assessment: 2 hours
Number of marks: 60

Unit F563 is assessed via a written examination comprising mathematics questions set in an engineering context.

Length of assessment: 2 hours
Number of marks: 60

5.3 Assessment availability

Please see section 8 in this centre handbook for details on the availability of assessment for externally assessed units.

Full details on the administrative arrangements for this line of learning are provided in the *OCR Admin Guide (14-19 Qualifications)*

6 Internal Assessment

6.1 The internally assessed units

All units, except Units F556 to F558, F560 to F562 and F564 have been designed to be internally assessed, applying the principles of controlled assessment as set out in the QCA document QCA.07/3208. Controls are set within the assessments so that validity and reliability are ensured and the assessors can confidently authenticate the learners' 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 for the OCR Level 3 Principal Learning in Engineering, the form of assessment section of the units includes specific requirements on the nature of evidence.

6.2 Task setting

6.2.1 The OCR approach

For this qualification OCR will assume a medium to high level of control in relation to the setting of tasks. A range of model assignments will be available from OCR for the internally assessed units. These will be a series of complimentary tasks placed within a work-related context to ensure coherence. This will usually take the form of a scenario; a case study; a brief for a defined client or customer; or an assignment.

These model assignments have been designed to meet the full assessment requirements of the unit. Learners 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. Learners may carry out preparations prior to undertaking the tasks; there is no time limit for this but this will be over and above the guided learning hours designated for the assessment task.

It is intended that over time additional model assignments will be developed in partnership with consortium/centres and quality assured by OCR. These additional model assignments will be made available to other consortia, ideally being made available to download from our website www.ocr.org.uk

6.2.2 Using model assignments

Centres can choose one from the range of assignments offered by OCR. In time they could choose one of the model assignments produced in partnership by Gateway Consortia. Model assignments can be used with a minimum amount of adaptation or they can be adapted so that the scenario and related tasks fit in with local sector needs and allow the usage of local resources available to any Consortia/Centre. These assignments can be used as models and benchmarks for consortia to advise their own exemplar material. Consortia should utilise appropriate tasks

which will generate the essential evidence to meet the particular unit assessment criteria; these tasks may be set within overarching scenarios and briefs more relevant to their own local Engineering environment and targeted at their particular cohorts of learners.

Model assignments may be adapted by consortia/centres in ways which will not put at risk the opportunity for learners 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 a company on which a model assignment is based. For other units the medium in which the learners are working may be a matter of choice. Each model assignment will include a section which briefly specifies the type and degree of adaptation which is appropriate.

The same OCR model assignment must NOT be used as the practice material and then as the actual live assessment material. Consortia/centres should devise their own practice material using the OCR model assignments as guidance.

6.2.3 Guidance for consortia/centres adding to the bank of exemplar materials

In setting or adapting tasks consortia/centres should draw on good practice in relation to the setting of assignments, work-related activities and case studies. Tasks must be set within the context of the assessment criteria and the marking grids but, additionally, the importance of the applied nature of the qualification should be addressed.

The opportunity for a centre to use OCR model assignments or to set their own tasks may vary for different units depending on the degree of control required and the need for contextualisation, localisation etc.

Criteria for the development of exemplar assessment material will be published during the first year of the programme. Guidance on the process, which will be managed centrally, will be included in the criteria.

The tasks for the internal assessment, which form the majority of the Principal Learning, must be developed to fit into a centre's programme of delivery both at unit level and across the qualification; they must not be bolt on additions to the learning process. Tasks must be placed in an appropriate sector context to ensure the applied nature of the qualification is not lost, be practical wherever possible and, where appropriate, be linked across more than one unit to avoid an atomistic approach.

6.3 Task taking

6.3.1 The OCR approach

For the Level 3 Principal Learning 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.

6.3.2   Definitions of the controls

(a) **Authenticity control:** Learners will complete all work for assessment under direct teacher supervision except as outlined below. For 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 learners will be encouraged but tightly defined. Within Engineering OCR expects teachers to supervise and guide learners who are undertaking work which is internally assessed. The degree of teacher guidance in learners' work will vary according to the kinds of work being undertaken. It should be remembered, however, that learners are required to reach their own judgements and conclusions. When supervising tasks, teachers are expected to:

- offer learners advice about how best to approach such tasks

- 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 learners to complete the assessment task will be suggested in terms of guided learning hours and specified within the unit. Tasks will be set within a broader learning programme which will allow the acquisition of sector specific knowledge and the development of appropriate practical skills.

Internally assessed work should be completed within the guided learning hours for the unit 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 learner's own work and be able to authenticate it using the specified procedure.

(d) **Collaboration control:** Learners must complete and/or evidence all work individually. With reference to collaboration control, all assessment evidence will be provided by the individual learner. However, where group work is either prescribed in certain units or suggested as an alternative to individual work it is vital to be able to identify the individual contribution, perhaps by using personal log, peer assessment, teacher witness statements.

(e) **Resource control:** Access to resources will be limited to those appropriate to the task and as required by the unit. Learners will need to be provided with the most appropriate materials and equipment to allow them full access to the marking criteria. For most units basic workshop, laboratory or workplace equipment will be adequate; however, for specific units the use of specialist equipment and software will be required to enable the learner to achieve fully.

(f) **Evidence specific controls:** Controls will vary depending on the type of evidence being presented. The above controls must apply equally to any type of evidence, recognising that a

paper-based approach may not be the most appropriate. For electronic evidence there will be a particular onus on the Centre to ensure authenticity. Web- or CD-based repositories may be used but Centres should be aware of the ease with which materials can be transmitted. However, technology can be used to track interventions within portfolios thus providing an additional security check. Ephemeral evidence will need to be supported by logs, progress reports and digital images with learner comments, and judged in relation to the final product. For three-dimensional artefacts it may not be possible to submit the product; evidence for these is likely to take the form of authenticated photographs showing the artefact in context, with an indication of scale and from more than one dimension.

6.3.3   Quality assuring the controls

It is the responsibility of the Head of Centre to ensure that the controls set out in this section of this centre handbook and the individual units are imposed. OCR will quality assure this through a system of centre inspection which will include assuring the centre processes and observing some local assessment on a sampling basis. For this reason centres may be asked to notify OCR of dates and times when learners are undertaking the tasks which comprise the assessment of the locally assessed units.

6.3.4   Completing the tasks

Learners should be allowed sufficient time to complete all of the tasks. Each unit will give a suggested number of guided learning hours for completing the assessment tasks and this will vary depending on the nature of the task and the ability of the individual learner. 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 sector knowledge and develop appropriate practical skills

Each learner must produce individual and authentic evidence for each of the tasks. It is particularly important that learners 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 learners. This support and guidance should focus on checking that learners understand what is expected of them. It is not acceptable for tutors to provide model answers or to work through answers in detail.

Learners may use information from any relevant source to help them with producing evidence for the tasks unless there are any restrictions on any evidence or resources to be used, if this the case it will be clearly identified within the particular unit.

Where a dataset or case material is provided it is acknowledged that learners 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. However, in general, learners 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.

6.3.5   Presentation of work

Centres should discourage learners from excessive use of plastic wallets for presentation of their evidence as this may hinder the assessment process. Instead centres may wish to encourage learners to present their work so that it is easily accessible, eg spiral bound, stapled booklet, treasury tag.

6.4   Task marking

6.4.1   The OCR approach

For this qualification OCR will assume a medium to high level of control in relation to the marking of tasks. All internally assessed units will be marked by the centre assessor(s) using awarding body marking grids and guidance and moderated by the OCR appointed moderator. External moderation will take the form of postal moderation or e-moderation where evidence in a digital format is required.

6.4.2   Applying the assessment criteria

The starting point for marking the tasks is the marking grids within each unit. These contain levels of criteria for the skills, knowledge and understanding that the learner 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 learner work which will help to clarify the level of achievement the assessors should be looking for when awarding marks.

A glossary of key words used in the marking grids for Engineering can be found in section 11.

6.4.3   Use of 'best fit' approach to marking criteria

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 objectives/criteria, one of the three 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 learner.

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

- Where the learner's work *convincingly* meets the statement, the highest mark should be awarded

- Where the learner's work *adequately* meets the statement, the most appropriate mark in the middle range should be awarded

- Where the learner's work *just* meets the statement, the lowest mark should be awarded.

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

Only one mark per assessment objective/criteria will be entered. The final mark for the learner for each unit is out of a total of either 60 or 90 (details are included each unit) and is found by totalling the marks for each of the marking objective/criteria strands.

6.4.4   Authentication

Teachers/course tutors must be confident that the work they mark is the learner's own. This does not mean that a learner 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 learner's work.

Wherever possible, the teacher/course tutor should discuss work-in-progress with learners. 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.

Learners 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 learner being disqualified. Plagiarism sometimes occurs innocently when learners are unaware of the need to reference or acknowledge their sources. It is therefore important that centres ensure that learners understand that the work they submit must be their own and that they understand the meaning of plagiarism and what penalties may be applied. Learners 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 learners as well as the potential risks of failing to acknowledge such material. Learners may be asked to sign a declaration to confirm that the work they submit is their own. Centres should reinforce this message to ensure learners understand what is expected of them.

Please note: Centres must confirm to OCR that the evidence produced by learners is authentic. The Centre Authentication Form, which can be downloaded from our website (www.ocr.org.uk), 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.

6.4.5   Internal standardisation

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

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

6.4.6   External moderation

Moderation of the Engineering Principal Learning units will be by postal moderation, from June 2009 there will be the option to submit for moderation using OCR's electronic repository. Further details are to be confirmed please check updates on the OCR website www.ocr.org.uk. The following notes are for general guidance; detailed instructions will be issued by OCR at the start of the programme.

OCR will offer two moderation periods within the year and awarding will also be twice yearly. Further information on the availability of moderation and awarding can be found in section 8 of this centre handbook.

The portfolio of evidence which is sent to the OCR Moderator for moderation must show how the marks have been awarded in relation to the marking criteria defined in the units.

All internal marking and standardisation procedures must be completed before moderation can take place. Marks are then submitted to OCR, after which moderation takes place in accordance with OCR procedures. The purpose of moderation is to ensure that the standard of the award of marks for internally assessed work is the same for each centre and that each assessor has applied the standards appropriately across the range of learners within the centre.

Before the moderation period centres will send to the appointed OCR Moderator the completed coursework summary form. The Moderator will then inform the centre of those learners who have been selected for the moderation sample.

The sampling strategy for the internally assessed units will be similar to those used for general qualifications but the details will be more fully documented in separate guidance based on Ofqual agreed moderation sampling rules. (Note August 2008: The sampling rules are currently under development. When the rules have been published OCR will ensure that centres are advised).

The moderator will notify the centre of the moderation sample required based on submitted marks. The centre is expected to comply strictly with published deadlines for the return of marks and despatch the requested sample promptly.

Normally sampled work will be returned to the centre upon the completion of moderation. However, OCR may need to retain work for the following reasons:

- to complete the moderation

- as an example of work for the Awarding Committee

- because there is an issue the Chief Examiner needs to consider

- for exemplification or exhibition purposes

Digitally submitted evidence will **not** be returned to the centre, as it is assumed that a copy of the evidence was taken by the centre prior to submission.

Any subsequent requests from the Moderator should be acted upon with the minimum of delay. The outcome of the moderation will be notified to the Centre in due course at which stage the Centre will have the right of appeal. After moderation has been completed, all unit evidence must be kept securely in the Centre until the results have been published and until any Results Enquiries/Appeals have been concluded.

7   Mapping and Signposting

7.1   Mapping to personal, learning and thinking skills

All six PLTS are integrated into the assessment criteria for Principal Learning and an indication of assessment opportunities is given within the assessment criteria. The grid below provides an overview, across the qualification of where those opportunities are.

Level 3 Principal Learning in Engineering - PLTS		Unit F556	Unit F557	Unit F558	Unit F559	Unit F560	Unit F561	Unit F562	Unit F563	Unit F564
Independent enquirers	**Young people process and evaluate information in their investigations, planning what to do and how to go about it. They take informed and well-reasoned decisions, recognising that others have different beliefs and attitudes.**									
	IE1: Identify questions to answer and problems to resolve			✓						
	IE2: Plan and carry out research, appreciating the consequences of decisions		✓	✓			✓	✓		
	IE3: Explore issues, events or problems from different perspectives						✓	✓		
	IE4: Analyse and evaluate information, judging its relevance and value	✓		✓	✓	✓		✓		
	IE5: Consider the influence of circumstances, beliefs and feelings on decisions and events							✓		
	IE6: Support conclusions, using reasoned arguments and evidence	✓		✓				✓		
Creative thinkers	**Young people think creatively by generating and exploring ideas, making original connections. They try different ways to tackle a problem, working with others to find imaginative solutions and outcomes that are of value.**									
	CT1: Generate ideas and explore possibilities		✓		✓	✓				
	CT2: Ask questions to extend their thinking				✓					
	CT3: Connect their own and others' ideas and experiences in inventive ways									
	CT4: Question their own and others' assumptions									
	CT5: Try out alternatives or new solutions and follow ideas through		✓							
	CT6: Adapt ideas as circumstances change		✓							

Level 3 Principal Learning in Engineering - PLTS		Unit F556	Unit F557	Unit F558	Unit F559	Unit F560	Unit F561	Unit F562	Unit F563	Unit F564
Reflective learners	**Young people evaluate their strengths and limitations, setting themselves realistic goals with criteria for success. They monitor their own performance and progress, inviting feedback from others and making changes to further their learning**									
	RL1: Assess themselves and others, identifying opportunities and achievements									
	RL2: Set goals with success criteria for their development and work									
	RL3: Review progress, acting on the outcomes			✓						
	RL4: Invite feedback and deal positively with praise, setbacks and criticism									
	RL5: Evaluate experiences and learning to inform future progress			✓				✓		
	RL6: Communicate their learning in relevant ways for different audiences									
Team workers	**Young people work confidently with others, adapting to different contexts and taking responsibility for their own part. They listen to and take account of different views. They form collaborative relationships, resolving issues to reach agreed outcomes**									
	TW1: Collaborate with others to work towards common goals									✓
	TW2: Reach agreements, managing discussions to achieve results			✓						
	TW3: Adapt behaviour to suit different roles and situations									✓
	TW4: Show fairness and consideration to others									
	TW5: Take responsibility, showing confidence in themselves and their contribution									
	TW6: Provide constructive support and feedback to others									
Self-managers	**Young people organise themselves, showing personal responsibility, initiative, creativity and enterprise with a commitment to learning and self-improvement. They actively embrace change, responding positively to new priorities, coping with challenges and looking for opportunities**									
	SM1: Seek out challenges or new responsibilities and show flexibility when priorities change									

Level 3 Principal Learning in Engineering - PLTS		Unit F556	Unit F557	Unit F558	Unit F559	Unit F560	Unit F561	Unit F562	Unit F563	Unit F564
	SM2: Work towards goals, showing initiative, commitment and perseverance									
	SM3: Organise time and resources, prioritising actions			✓		✓				
	SM4: Anticipate, take and manage risks	✓								
	SM5: Deal with competing pressures, including personal and work-related demands									
	SM6: Respond positively to change, seeking advice and support when needed									
Effective participators	**Young people actively engage with issues that affect them and those around them. They play a full part in the life of their school, college, workplace or wider community by taking responsible action to bring improvements for others as well as themselves**									
	EP1: Discuss issues of concern, seeking resolution where needed									
	EP2: Present a persuasive case for action	✓		✓				✓		
	EP3: Propose practical ways forward, breaking these down into manageable steps			✓			✓	✓		
	EP4: Identify improvements that would benefit others as well as themselves									
	EP5: Try to influence others, negotiating and balancing diverse views to reach workable solutions							✓		
	EP6: Act as an advocate for views and beliefs that may differ from their own									

7.2 Signposting to functional skills

Guidance on the full range of opportunities for developing and applying functional skills within a sector specific context are indicated in each unit of principal learning. The grid below provides an overview, across the qualification of where those opportunities are.

Level 3 Principal Learning in Engineering – signposting to functional skills	Unit F556	Unit F557	Unit F558	Unit F559	Unit F560	Unit F561	Unit F62	Unit F563	Unit F564
English	✓	✓	✓	✓	✓	✓	✓		
Mathematics	✓			✓	✓	✓		✓	✓
ICT		✓		✓		✓	✓		✓

8   Administration Arrangements

A separate publication, the *OCR Admin Guide 14-19 Qualifications* will provide full details of the administration arrangements for this qualification. The guide will be published on our website at www.ocr.org.uk

Centres must consult the Admin Guide for all administrative arrangements concerned with this qualification but a summary of the main arrangements follows.

8.1   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.

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

Entries can be made online via Interchange or using EDI.

Unit Entry code	Submission method	Unit titles
F556/A	OCR Repository*	Engineering businesses and the environment
F556/B	Postal moderation	
F557/A	OCR Repository*	Applications of computer aided designing
F557/B	Postal moderation	
F558/A	OCR Repository*	Selection and application of engineering materials
F558/B	Postal moderation	
F559	Externally assessed	Instrumentation and control engineering
F560/A	OCR Repository*	Maintaining engineering systems
F560/B	Postal moderation	
F561/A	OCR Repository*	Production and manufacturing
F561/B	Postal moderation	
F562/A	OCR Repository*	Innovative design and enterprise
F562/B	Postal moderation	
F563	Externally assessed	Mathematical techniques and applications for engineers
F564/A	OCR Repository*	Scientific principles and applications for engineers
F564/B	Postal moderation	

*OCR Repository will only be available from June 2009 onwards

8.2 Assessment Availability (externally assessed units)

In the first year of operation, from September 2008 to August 2009, there will only be one examination series available (in June 2009).

From September 2009 onwards there will be **two** examination series each year in January and June. Full details of the examinations series are published and found in the *OCR Admin Guide (14-19 Qualifications),* available from our website (www.ocr.org.uk)*.*

8.3 Moderation and awarding availability (internally assessed units)

OCR will offer two moderation periods within the year and awarding will also be twice yearly.

In the first year of operation, from September 2008 to August 2009, moderation will only be offered **for some of** the internally assessed units. Please check our website for details www.ocr.org.uk

From September 2009 onwards moderation will be offered twice yearly for all the internally assessed units. Full details of the moderation dates are found in the *OCR Admin Guide (14-19 Qualifications),* available from our website (www.ocr.org.uk)*.*

8.4 Terminal rules

There are no terminal rules in this qualification, therefore units can be taken in any order.

8.5 Unit and qualification re-sits

Learners may re-sit the examined and moderated units an unlimited number of times before entering for certification for Principal Learning.

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

8.6   Making qualification entries

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

Learners may enter for:

H811 OCR Level 3 Principal Learning in Engineering

Principal Learning certification is available from June 2009 for Levels 1 and 2, June 2010 for Level 3.

8.7   Grading

Grading of Principal Learning

Each principal learning unit will be either internally or externally assessed according to set criteria and mark schemes. This will result in a 'raw' mark for each learner, assessors will be awarding marks to learners and not grades. Raw mark grade boundaries for each unit will be determined by an awarding committee consisting of senior assessors and based on the performance of the learners. These boundaries are not pre-set and may change from series to series. Once the grade boundaries have been chosen, each raw mark score is converted to a points score depending on the grade achieved. Although raw mark grade boundaries may vary, points boundaries are pre-set.

Principal learning is a qualification in its own right. Once a learner has results for all the principal learning units in a line of learning at a given level, qualification grades are calculated by adding learners' points score for each unit. This total score will determine the principal learning qualification grade.

Grading the diploma

There are three constituents to the diploma: Principal Learning, Additional and Specialist Learning and generic learning. Generic learning consists of the Project (Foundation, Higher or Extended), Functional Skills, work experience and PLTS. Of these six elements only the Principal Learning and the Project contribute to the diploma grade. The grades awarded separately for Principal Learning and the Project are translated into points scores and the diploma grade is calculated by adding together these points. Provided that this score is more than the minimum required for the lowest achievable grade for the level of the diploma and all other elements of the diploma have been passed (ie. Additional and Specialist Learning, Functional Skills, work experience and PLTS), then a diploma will be awarded.

8.8   Shelf-Life of Units

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

8.9   Unique Learner Numbers

The Unique Learner Number (ULN) is a personal 10-digit number, which is essential for candidates taking a Diploma programme of study. This is used to link the Diploma component results together for Diploma certification. The ULN is obtained by the candidate's home centre and must accompany a candidate's entry for any qualification which they intend to count towards their Diploma, including Principal Learning, Project/Extended Project, Functional Skills and Additional and Specialist Learning, e.g. GCE or GCSE.

9   Supporting Documentation

9.1   OCR model assignments

OCR model assignments for the internally assessed units can be downloaded from our website: www.ocr.org.uk.

For more information on using model assignments please see section 6.

9.2   Sample assessment materials

Sample assessment materials for the externally assessed units can be downloaded from our website: www.ocr.org.uk

10 Further Support and Information

10.1 General enquiries

For general enquiries relating to any of OCR's qualifications, please contact the OCR Customer Contact Centre:

For queries relating to vocational qualifications:
Telephone: 02476 851 509
Fax: 02476 421 944
Email: vocational.qualifications@ocr.org.uk

For queries relating to general qualifications:
Telephone: 01223 553 998
Fax: 01223 552 627
Email: general.qualifications@ocr.org.uk

(The teams in both our contact centres can help you with your queries relating to Diplomas, Principal Learning and the Project.)

Alternatively, you could visit OCR's website at www.ocr.org.uk for further information on OCR qualifications.

10.2 Customer feedback

We welcome feedback from customers on all aspects of our provision. Comments relating to this documentation should be sent to:

The Qualification Manager
Principal Learning in Engineering
Progress House
Westwood Way
Coventry
CV4 8JQ

10.3 OCR Training Events

Information on OCR's training events for centres can be found on our website by going to www.ocr.org.uk, or by contacting:

OCR Training
Customer Support Division
Progress House
Westwood Way
Coventry
CV4 8JQ

Telephone: 02476 496 398
Fax: 02476 496 399
Email: training@ocr.org.uk

10.4 OCR Publications

The OCR Publications Service offers support to OCR customers, centres, parents and learners. It offers a wide range of up-to-date materials for sale which relate to our key qualifications. These materials include specifications, past papers, mark schemes and a range of support materials.

The OCR Publications Catalogue holds the full list of materials currently available to order. To obtain a copy of this and to order publications, please go to http://publications.ocr.org.uk or call our dedicated orderline on 0870 770 6622.

Orders can also be emailed to publications@ocr.org.uk or posted to the address on the order form printed in the OCR Publications Catalogue.

OCR Support Materials prepare extra resources to help you deliver our qualifications. These support materials can be ordered from OCR Publications and more information about the materials can be obtained from support.materials@ocr.org.uk

11 Marking Criteria Glossary

This glossary is to be used in relation to the assessment/marking grids. These are generic descriptions for the most commonly included words.

adapt
make suitable by changing

adequately
it is clear that the learner understands the concepts and principles but may not have provided the full details, expansion or examples needed in order to gain the highest marks. (relates to the 'best fit' approach in the handbook.)

adopt
choose to accept

adjust
change to make suitable

agree
concur

analyse
separate information into components and identify their characteristics

anticipated
foreseen event
expect something will happen, possibly taking action in preparation for it happening

apply
put into effect in a recognised/organised way

assemble
fit together the parts or sub-elements

assess
make an informed judgement

basic
the work comprises the minimum required and provides the base or starting point from which to develop. Responses are simple and not complicated; the simplest and most important facts are included

calculate
apply mathematical principles

carry out
put into practice

check
test for accuracy and correctness

clear
the evidence related to a statement exists and is directly relevant to the task

collaborate
work in partnership

collects
gather together

communicate
made known, transfer information

compare
identify similarities and differences

complete
finish/bring to a conclusion

complex
the work produced has a number of interwoven parts which have been correctly related.

complicated
containing intricately combined or involved parts

comprehensive
the work is complete and includes everything that is necessary to evidence understanding in terms of both breadth and depth

consider
review and respond to given information

contribute
offer ideas/practical input (eg to a group activity)

convincingly
all the material requirements of a statement have been met including the provision of sufficient examples and contexts. Anything additional would move a learner into the next band. (Relates to the 'best fit' approach in the handbook.)

create
originate

demonstrate
show in an explicit way

describe
set out characteristics – could be diagram, report etc

design
work out creatively/systematically

detail
to describe something item by item, giving all the facts

detailed
work includes item by item descriptions and includes or considers all the relevant information for the marking criterion statement

determine
find out

develop
progress/expand from a starting point

devise
work out by thinking or doing

disassemble
take apart the parts of a machine or structure

discuss
present salient points
present , explain and evaluate salient points (eg for/against an argument)

draw
put ideas down on paper

enable
allow, to make someone able to do something, or to make something possible

estimate
assign an approximate value

evaluate
judge from available evidence
judge from available knowledge/experience

examined
investigate closely

exchange
provide a substitute, transfer data

executed
carried out

exhibits
demonstrates or has certain properties

explain
set out the purposes or reasons

explore
investigate purposefully

extract
draw out

follow
carry out a procedure

formed and worked
shaped

identify
name or otherwise characterise

improve
make better

influence
affect in some way

input
contribution (eg to an argument/discussion/activity)

interpret
translate information into recognisable form
translate/explain information in an understandable form

investigate
to delve into

judge
consider, to form, give or have an opinion

justify
present a reasoned case

just
if there was any less evidence for the statement in the learner's work, a statement at the next lowest band would be more appropriate. (Relates to the 'best fit' approach in the handbook.)

limited
the work produced is small in range or scope and includes only a part of the information required; it evidences partial, rather than full, understanding

list
document a series of outcomes or events or information

little
a very small amount of evidence, or low number of examples, compared to what was expected, is included in the work

maintain
keep working, to keep machinery etc in good working condition

managed
take control of/monitor and take action where necessary

manufacture
work and assemble materials to create products

model
a representation which can be tested

modification
make worthwhile changes

most
at least 75% of the content which is expected has been included

operate
control the action of a product

outline
set out main characteristics

persuade
make someone do or believe, do something by reasoning

plan
consider, set out and communicate what is to be done

predict
to say that an event or action will happen in the future, as a result of knowledge or experience

present
- produce an exposition/resumé for an audience
- set out (project) aims, content, outcomes and conclusions clearly/logically for the use/benefit of others

produce
construct or manufacture

prototyped
first manufactured product which is then tested

provide
make available

prove
demonstrate validity on the basis of evidence

range
the evidence presented is sufficiently varied to give confidence that the knowledge and principles are understood in application as well as in fact

reasonable
the work, whilst not ideal, is of a quality and type which is acceptable for the task and level

reasoned
justified, to understand and to make judgments based on practical facts

record
to indicate/note something, keep information for the future, by writing it down, drawing it or storing it

refer
reflect upon

research
look into and extract relevant information, issues etc

review
survey information
survey and reconsider information /methods/outcomes/conclusions etc after the event

running
operating a process

select
choose, to choose things or to choose by making decisions

set up
prepare a system for operation

show
present

produce an exposition/resumé for an audience
set out (project) aims, content, outcomes and conclusions clearly/logically for the use/benefit of others

simple
the work is composed of one part only, either in terms of its demands or in relation to how a more complex task has been interpreted by the learner

simulated
to reproduce the conditions of a procedure as in carrying out an experiment

some
about 50% of the content which would have been expected is included

state
express in precise terms

suggest
give possible alternatives, produce an idea

test
an examination or trial

understanding
know the meaning of

undertake
take part in

use
bring into action

verified
prove to be true

wide
the learner has included many relevant details, examples or contexts thus avoiding a narrow or superficial approach

worked
undertake tasks

12 The Diploma - components and features

12.1 An introduction

This section provides an overview of the Diploma.

OCR will introduce its Diplomas into centres from 2008. Designed principally, although not exclusively, for 14 to 19 year olds each diploma explores a range of widely applicable skills and knowledge within the context of one employment sector. At the heart of the Diploma is the concept of applied learning – acquiring knowledge and skills through tasks or contexts that have many of the characteristics of real work.

Each Diploma has three components:

- Principal learning

- Generic learning

- Additional and specialist learning

For a full list of the Diploma work related sectors please refer to www.qca.org.uk

12.2 Diploma aims

- The Diploma in engineering is for all learners, and has particular relevance to 14 to 19 year old learners who seek to acquire knowledge and understanding, and develop skills in the broad context of the engineering industries.

- The purpose of the Diploma in Engineering at is to introduce learners to the world of the engineering industry.

- Principal learning provides the essential knowledge, skills and understanding for all learners within the sector(s) covered. Specialist learning enables learners to acquire a deeper understanding and/or application of the topics covered in principal learning or to explore a related topic with a more local focus.

Each Diploma in engineering will:

- give opportunities to practise and acquire essential functional skills in English, mathematics and ICT, which are relevant to the level and delivered in the context of engineering

- enable individuals to acquire relevant personal, learning and thinking skills (PLTS) in an engineering context

- offer progression to other Diplomas, to transfer laterally and progress to further education, apprenticeships and training

- aid effective transition to further education, work-based learning or higher education and to working life

- provide a motivating learning experience for individuals, through a blend of general education and applied learning within a coherent and stimulating programme.

12.3 Diploma structure

Level 1 Foundation Diploma: 600 glh

Principal Learning 240 glh	Generic Learning 200 - 240 glh	Additional and Specialist Learning 120 – 160 glh
• 50% Applied Learning • 30 glh must be externally assessed	• Functional Skills English, maths and ICT at Level 1 = 120 glh • Project = 60 glh • Work experience min 10 days	
Personal, learning and thinking skills = 60 glh		

Level 2 Higher Diploma: 800 glh

Principal Learning 420 glh	Generic Learning 200 glh	Additional and Specialist Learning 180 glh
• 50% Applied Learning • 60 glh must be externally assessed	• Functional Skills English, maths and ICT at Level 2 = 80 glh • Project = 60 glh • Work experience min 10 days	
Personal, learning and thinking skills = 60 glh		

Level 3 Advanced Diploma: 1080 glh

Principal Learning 540 glh	Generic Learning 180 glh	Additional and Specialist Learning 360 glh
• 50% Applied Learning • 120 or 180 glh* must be externally assessed	• Functional Skills English, maths and ICT at Level 2 • Extended Project = 120 glh • Work experience min 10 days	
Personal, learning and thinking skills = 60 glh		* Dependent on line of learning

Level 3 Progression Diploma: 720 glh – for learners 16+

Principal Learning 540 glh	Generic Learning 180 glh	
• 50% Applied Learning • 120 or 180 glh* must be externally assessed	• Functional Skills English, maths and ICT at Level 2 • Extended Project = 120 glh • Work experience min 10 days	
Personal, learning and thinking skills = 60 glh		* Dependent on line of learning

12.4 Principal learning

Please see section 2 of this centre handbook for the key features of Principal Learning

12.5 Generic learning

Through the generic learning component, learners develop and apply the knowledge and skills necessary for learning, employment and personal development. Generic learning includes:

- functional skills

- personal, learning and thinking skills

- work experience

- an extended project

12.5.1 Functional skills

Key features of functional skills:

- Functional skills are available in English, mathematics and information and communication technology (ICT)

- Functional skills are discrete qualifications as well as an integral part of the diploma qualification.

- Learners studying a level 1 Diploma must acquire functional skills in English, mathematics and ICT at Level 1.

- Learners studying a level 2 or level 3 Diploma must acquire functional skills in English, mathematics and ICT at Level 2.

- Centres should integrate functional skills development into learning and assessment. OCR has signposted these skills within the Principal Learning qualification (see section 7 of this centre handbook).

12.5.2   Personal, learning and thinking skills

Please see section 2 of this centre handbook for the key features of personal, learning and thinking skills.

12.5.3 Work experience

Key features of work experience:

- Work experience is not a compulsory part of the principal learning component.

- Work experience is a compulsory part of the Diploma. All learners must undertake 10 days work experience.

- This work experience should support work related learning, provide opportunity for the collection of evidence for Principal Learning, particularly the personal, learning and thinking skills, enhance the learning experience and support the development of both sector specific and employability skills.

- Work experience is not assessed.

12.5.4 The extended project

Key features of the extended project*:*

- The project provides an opportunity to learn about project management and encourages independent learning.

- Each learner is able to tailor their project to fit their individual needs, choices and aspirations. The project topic must complement and develop the themes and topics of the learner's principal learning or support learner progression.

- Topics for the project must be negotiated and agreed between the learner and assessor.

12.6 Additional and specialist learning

Key features of the additional and specialist learning:

- Additional and specialist learning comprises units or qualifications selected by the learner (or centre) from the Diploma catalogue.

- Additional learning is complementary to the sector and allows learners to choose topics to reflect their interests, needs and aspirations.

- Specialist learning compromises units or qualifications recommended by employers or Higher Education advisers. These units or qualifications support progression within the sector.

- Specialist learning pathways are available for some qualifications identified as additional and specialist learning, please refer to the Diploma catalogue at www.accreditedqualifications.org.uk. Learners will need to select units as indicated in the diploma catalogue to follow these specialist areas.

Appendix A: Guidance for the Production of Electronic Evidence

Each Principal Learning qualification is made up of a number of mandatory units.

The evidence for these qualifications will vary depending on the approach taken. The various forms of evidence can be submitted electronically using the OCR Repository from June 2009. (Further information on this topic is provided in the separate OCR *Guidance on Digital Controlled Assessment Submissions.*)

The following evidence **must** be submitted:

- Outcome of the unit

- Unit Recording Sheet

- Coursework Summary Form

- Centre Authentication Form.

Optional evidence may be included, for example:

- a diary or IT logging system

- an experiment

- images stored on various media.

Structure for evidence

The learner's evidence should be filed in a collection of folders and files which 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 using an index, called 'Home Page'.

There should be a top-level folder detailing the learner's centre number, unique learner number, surname and forename, together with the qualification code and unit code, so that the evidence is clearly identified as the work of one learner.

Each learner's folders should be stored in a secure area on the centre network. The centre should upload the following documentation to the centre folder in the Repository by the coursework submission deadline:

- Centre Authentication Form

- Coursework Summary Form.

Data formats for evidence

In order to minimise software and hardware compatibility issues it will be necessary to save learners' work using an appropriate file format. (Further information on this topic is provided in the separate OCR *Guidance on Digital Controlled Assessment Submissions.*)

Learners 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.

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 evidence submitted for moderation is accessible to the moderator and fully represents the evidence available for each candidate.

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

Please consult OCR guidance on digital Controlled Assessment submissions for advice on compatibility of versions of these file formats.