

# Principal Learning

## Engineering

OCR Level 2 Principal Learning H810

### OCR Report to Centres

**January 2012**

**H115/H315/R/12J**

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This report on the examination provides information on the performance of candidates which it is hoped will be useful to teachers in their preparation of candidates for future examinations. It is intended to be constructive and informative and to promote better understanding of the specification content, of the operation of the scheme of assessment and of the application of assessment criteria.

Reports should be read in conjunction with the published question papers and mark schemes for the examination.

OCR will not enter into any discussion or correspondence in connection with this report.

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## Overview

This is the fourth year of assessment, with this being the sixth award for the Principal Learning units within the Diploma in Engineering. There are eight units at level two and all have been assessed during the four years.

The opportunities for presenters to attend INSET, to use the excellent support materials provided and make their views known on the delivery and assessment of units has helped the development of many of the units within the scheme. All presenters are encouraged to attend one of a number of opportunities that are available for training.

Presenters and markers are reminded that progression across the mark bands is characterised by (i) increasing breadth and depth of understanding (ii) increasing coherence, evaluation and analysis (iii) increasing independence and originality.

In some cases, learners need to be shown how to interpret more carefully the evidence requirements for each mark band and it was difficult to find a real progression across the mark bands.

There is evidence that some centres are becoming systematic in their approach to this diploma. With this systematic approach in mind 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 presenters.

When a disc is being submitted more attention needs to be paid to the labelling of files. In future each learners file must be named according to the following instructions:  
Centre number\_Candidate number\_Unit number\_Series.

## Unit F548 The Engineered World

The following points need to be considered:

- In the information for presenters it clearly states that the digital video recorder in use must be able to store at least fifteen minutes of recording. In some cases, the presenter needs to ensure that most of the time is used even if the questions are repeated again and appropriate prompts are given.
- A number of centres did not provide a quiet enough room in which to conduct the viva-voce.
- It is strongly recommended that after the first learners recording it is checked for quality and any necessary action taken.
- The presenter may ask for further clarification if the learner's initial utterance is ambiguous, incomplete or too inaccurate. However prompts that include statements that gave the learner clues to enable them to answer a question correctly are not permitted.
- The presenter must be careful that they do not give too much support when prompting. Being over enthusiastic can lead presenters to giving the answers to questions. It is important for presenters to watch other presenters so that consistency, reliability and validity are maintained.
- The presenter must read out the exact question and not change any of the words or meanings because there must be consistency for every learner.
- For the viva-voce learners may take into the preparation room and examination room a work book that has been compiled for use during the viva-voce. The learner can refer to the work book but must not be allowed to read out prepared material during the viva-voce.
- A number of learners spent a lot of time flicking through their workbook. It is suggested that a contents page with page numbers is placed at the front of their booklet. This should assist learners in finding information that they want in order to answer a question.
- In future it would be useful to the markers if all centres could have in view, for each learner, a card with their centre number, candidate number and name printed on it.
- Presenters are reminded that during the recording of the viva-voce it is in order for them to go back over questions if there is time available and if the learner requests it.
- There is a maximum of 15 minutes for the viva-voce. The presenter is instructed to let the learner know when there are 2 minutes left. In a number of cases the presenter did not follow this instruction.
- More attention needs to be paid to the labelling of files. In future each learners file must be named according to the following instructions:  
Centre number\_Candidate number\_Unit number\_Series.
- In addition, an indication of the contents of the CD/DVD must be written on the disc, self-adhesive notes are not sufficient for this purpose.
- Centres are reminded that compact discs or digitally submitted evidence will not be returned. A copy of the evidence must be made and stored under secure conditions as a back-up copy of the evidence until the results are published.

### Question One

- (a) Please identify an engineering achievement that you have researched.
- (b) Explain how people's lives have changed as a result of this engineering achievement (these are known as human effects).

All learners correctly identified an engineering achievement that they had researched. A number of learners wasted their time by giving times and dates of achievements which had no bearing on the answer to this part of the question. Learners included several correct clear and logical

examples of the human effects that had resulted from this chosen achievement others gave a limited explanation of a single human effect.

During the delivery of this unit, an appreciation of the typical questions should be included in the selection of an engineering achievement. Several inappropriate achievements were chosen making the answering of the questions very difficult.

### **Question Two**

Please tell me about any political issues which may have driven the development of the engineering achievement you have researched.

Some learners were unable to describe the political issues that had driven the development of the engineering achievement that they had chosen. In some cases the choice of achievement made it less obvious to answer. It is suggested that centre's read the unit specification assessment criteria 1.4. This state's "Identify and assess the social, human, economic and political issues that drove the achievement".

### **Question Three**

Choose an engineering professional body and explain the nature of the work they do.

Most learners correctly identified a specific engineering professional body. Most learners gave an adequate explanation of the work it does and some merits of professional body membership with at least one relevant example. Learners are encouraged to consider the major institution in the UK which is the Institution of Engineering and Technology (IET). Learners can access a range of knowledge, services, events, professional support, news, views and topics from five sectors e.g. Built Environment, Design & Production, Energy, Information & Communications and Transport.

In a number of cases the learner identified a person rather than an organisation. It is permitted to correct this assumption as long as the correction does not give an answer. So for example a prompt of 'you need to tell me about an organisation not a person' would be in order.

### **Question Four**

- (a) Please name two engineering sectors you have studied.
- (b) Describe the job role of a professional person within any engineering sector.

Most learners correctly identified two engineering sectors they had studied. The good learners gave a detailed explanation about the job role of a professional person. There is still some confusion about the job role of a professional person as compared to the job role of a craft person or technical person. Learners are advised to concentrate on the tasks, qualifications, progression routes and responsibilities of a professional person rather than wider issues such as salary and holiday entitlement.

### **Question Five**

- (a) What is the difference between renewable and non renewable resources
- (b) Now, please tell me about recycling of materials in the engineering industry. You need to give examples of recycling in your answer.

Most learners correctly stated the difference between renewable and non-renewable resources, usually with examples of each sort of resource. Recycling was more mixed, some learners gave a broad definition of recycling and recyclable materials without a specific engineering context. One centre had obviously carried out research on the Honda approach to recycling and this produced some very good answers.

### Question Six

What can you tell Martin about his responsibilities as a young person using a machine and the responsibilities of his employer

A mixed response. Few learners received marks for a detailed explanation of the responsibilities of a young person using a machine. Other learners gave a basic answer which did not make reference to Martin seeking a further interview with the employer, visiting a Citizens Advice Bureau or similar organisation for advice or any reference to trade union support or seeking advice from an employment tribunal.

Good answers referred to employers carrying out a range of requirements governing such aspects as

- (a) checking whether or not Martin could work with machines as a young person (some reference was made to age)
- (b) the training of Martin in all aspects of the job including health and safety issues
- (c) providing safe machinery and equipment
- (d) carrying out regular health and safety checks
- (e) carrying out a risk assessment to assess the dangers of particular work activities
- (f) minimum temperature regulations in the workplace

Presenters are encouraged to look at the reference [www.direct.gov.uk](http://www.direct.gov.uk)

## Unit F549 Engineering Design

The unit was marked by centres and moderated by OCR.

The following points need to be considered:

- More care needs to be taken when the Unit Recording Sheet is filled in. Most centres' need to provide more teacher comments in the panel provided.
- Most learners presented work in a neat and tidy fashion but the use of a contents list with page numbers is to be encouraged.
- A number of folders followed the same type of presentation with a similar use of some material. In general terms, the centre should be empowering learners to take charge of their own learning and development. There is scope within the tasks for centres/learners to choose their own product and devise their own design brief.
- It was encouraging to see some learners presenting their work in clearly defined chapters/sections relating to assessment criteria.
- The model assignments chosen by the learners allowed for easy access to both disassemble and compare strengths and weaknesses.
- Developing their own design brief gave centres/learners the ability to tailor schemes of work to their particular resources and abilities.
- It was encouraging to see most learners choosing to improve the function rather than just the aesthetics of the chosen product.
- Choosing the more functional aspects of a product to study, allowed learners to investigate mechanisms, electrical/electronic circuits and/or structures. This gave learners access to a much wider range of possible communication and modelling techniques such as circuit diagrams, flow diagrams, overlays, 2D/3D mechanical models and structural diagrams/models.

### Assessment Criteria 1

It would be helpful if learners presented their key criteria in sections i.e. needs of the user, needs of the manufacturer, fitness for purpose.

It is important that learners disassemble their chosen product in real time and support this with photographic evidence.

Learners should describe in detail the manufacturing processes involved in making their chosen product, without this they cannot access the higher mark band.

Strengths and weaknesses comparison of similar products was not evident in much of the work and where it was more detail was needed.

A useful method of presenting analysis of strengths and weaknesses of a product and comparison to a range of similar products is in chart form. Areas such as aesthetics, ergonomics, safety, materials, fitness for purpose, sustainability etc. should be considered.

Meaningful and objective conclusions must be drawn from this comparison if the higher mark band is to be accessed.

### Assessment Criteria 2

Most learners gave a limited response to legislation stating only the more obvious generic issues.

Photographs of labels showing CE and Kite Marks were as far as many learners went in showing an understanding of legislation.

To access the higher mark band learners must show a detailed understanding of the implications of the standards relevant to their selected product.

It would be useful if the chosen product was disassembled into its component form and standards and legislation addressed to all of these.

From this understanding learners should draw conclusions as to the implications for their chosen product.

This could include reference to the risk from burning, earth points, toxic materials and pinch points.

### **Assessment Criteria 3**

Most design briefs were very simplistic and general in nature.

Design briefs should relate to an improvement which learners have identified in their disassembly of the product.

Specifications needed detailed and reasoned justification to access the higher mark band.

Many specifications were too generic and lacked meaningful justification.

It would be useful if specifications were presented in areas such as those given in assessment criteria 1.

### **Assessment Criteria 4**

To access the higher level mark band learners should independently select the most appropriate communication techniques. There must be evidence of this in their work and this could take the form of a chart of techniques giving uses and advantages.

A range of communication techniques was lacking in most learners work. Many learners showed a lack of ability in basic traditional drawing skills.

A wide range of presentation styles and techniques should include sketching, orthographic projections, isometric projections, exploded views, circuit diagrams, CAD and 2D/3D modelling.

Modelling would be a good way of demonstrating structural issues and mechanisms.

In many cases drawings lacked clarity and accuracy which is essential for learners to gain the higher band marks.

Detailed annotation was not evident in much of the work.

### **Assessment Criteria 5**

Tests should be done in real time with photographic evidence supporting this. Questionnaires and subjective surveys do not give learners the opportunity to do scientific tests and mathematical analysis. This denies them access to the higher level mark band.

Learners could use some of the tests outlined in Unit 545 Introduction to engineering materials.

Few learners produced clear meaningful conclusions from their test results.

## Unit 550 Engineering Application of Computers

The unit was marked by centres and moderated by OCR.

The following points need to be considered:

- Presenters and learners are reminded that an expert system is a computer program that contains some of the subject-specific knowledge of one or more human experts. The most common form of expert system is a program made up of a set of rules that analyse information (usually supplied by the user of the system) about a specific class of problems, as well as providing mathematical analysis of the problem(s).
- Learners should be able to recommend a course of user action in order to implement corrections.
- Learners should also understand, why embedded systems are used in modern domestic products, how computer systems are used in maintenance operations and, have a knowledge and understanding of the way computer-based communication systems are used to exchange data.
- Problems involving expert and control systems should be presented in real-life contexts with an emphasis on the application rather than systems theory.
- It is recommended that learners set out their report in assessment criteria order to assist in marking and moderating the work. These could be presented in Assessment Criteria "chapter" form. This would avoid the work being credited twice.
- It should be noted that some centres have dispensation to use a product other than a modern domestic product.

### Assessment Criteria 1

Learners must show how they independently investigated and thoroughly examined a modern domestic product to gain marks in the higher band. The chosen product must contain an embedded computer control system.

Learners must also have demonstrated a thorough understanding of how computers are used in a work setting, to design new parts, for production, for process control and for stock control, finance control and maintenance. These could be evidenced by screen shots, photographs and annotated control sheets.

Learners must also make thorough reference to the use of digital technologies.

### Assessment Criteria 2

Learners must show that they have developed a thorough understanding of simple computer control systems by providing evidence. Some learners did not simulate their computer control system. Learners must also show how they simulated complex control functions of the chosen modern domestic product to gain marks in the higher band.

Evidence for this could be with screen shots, running simulation software, modelling circuits/and or systems and photographs.

### Assessment Criteria 3

Learners must show that they understand what is meant by the term 'expert system'. Learners must demonstrate that they can input data into an expert system which can be evidenced by screen shots and print outs. Learners must also how they selected suitable parameters for problem solving.

More detail was needed to show how learners had interpreted results and used them to modify engineering features.

Learners must be able to explain how and why computers were used in the maintenance operations of their chosen domestic product.

To gain higher marks, learners needed to give a more detailed explanation of the methods used to input appropriate data into an expert system.

There was also little evidence of learners adjusting and correcting features to match requirements.

#### **Assessment Criteria 4**

To gain marks in the higher band learners needed to demonstrate that they had independently identified and explained the use of computer-based communication systems used to exchange data during the design and manufacturing and maintenance of their chosen modern domestic product.

More evidence was needed to show the use of

- (a) laptop computers to access and communicate information
- (b) personal digital assistants to record digital images, annotations and dialogue in real time
- (c) third generation mobile phones to record information in real time
- (d) down-loading and transferring information from communications devices in a form that is usable and accessible for engineering reports and portfolios =

In some of the work there was only a brief description of computer based communication systems.

For marks in the higher band learners not only needed detailed descriptions but also needed to explain and show in detail how they are used to exchange data during the design, manufacture and maintenance of the chosen product.

## Unit F551 Producing Engineering Solutions

The unit was marked by centres and moderated by OCR.

The following points need to be considered:

- It is advised that this assignment should link with the sector in which the learner has most experience.
- The purpose of this unit is to allow learners the opportunity to have the experience of producing practical solutions to simple engineering problems.
- The unit requires the learners to produce a comprehensive plan for the manufacture of an engineering solution from a set of engineering drawings and instructions which are provided by the centre. These must be detailed enough to allow the learners to work unaided.
- The chosen engineered product should include several components to allow the learners to demonstrate a range of engineering skills and processes.
- A product consisting of just two components and one material would not be suitable.
- Learners must independently select suitable; materials, manufactured parts, components, tools, equipment and processes. This must be evidenced for learners to be awarded marks.
- The learners must independently make a quality engineered solution using their own plan in a safe, effective and efficient manner.
- During production they will need to review their own progress, adapt to circumstances as they change and undertake appropriate quality checks – (this must be evidenced).
- Learners must be aware that these activities should be carried out in the context of production, maintenance, installation and commissioning.
- A diary of progress supported by photographic evidence is a good way of evidencing much of the above.

### Assessment Criteria 1

Learners must produce a detailed plan for making including, installing, commissioning and maintaining the selected product from the given engineering drawing and set of instructions.

In many cases commissioning and maintenance was not evident in the work.

Learners must also include details of how they selected suitable materials and how they used standard components and processes.

In much of the work more detail of how and why materials were selected was needed. This should include a reference to characteristics and properties.

Learners must relate the plan to health and safety issues, including a risk assessment of procedures for processing the materials and components. This must be evidenced.

Many learners considered their production plan alongside risk assessment and health and safety issues which proved a successful way of achieving this.

### Assessment Criteria 2

Learners need to produce a high-quality and accurate outcome that is detailed enough to allow them to demonstrate their use of a range of production and process skills.

Learners must produce a detailed record of their progress during making, showing how they adapted ideas as circumstances changed.

This could be done using real time photographic evidence and/or a diary of progress.

There must be evidence of any alterations to the production plan to gain marks in the higher band.

The outcome needs to be clearly evidenced. This is best done with annotated photographic evidence. These should include close-ups of individual components.

Learners must also produce evidence to show how they checked the performance of their risk assessment and make any necessary modifications to this process risk assessment.

### **Assessment Criteria 3**

Learners must produce evidence that they used quality control checks in the making, installation, commissioning and maintenance of their product.

Again in much of the work there was little evidence of this being done in regards to installation, commissioning and maintenance.

There must be evidence of quality control checks throughout the production of the product.

Learners should be encouraged to use a range of quality control checks. There was little evidence in much of the work of jigs and formers being used. There must also be evidence of a review of progress with changes made. This is best done with real time photographic evidence and/or a diary of progress.

Witness statements are not an acceptable method of evidencing this.

# Unit F552 Construct Electronic and Electrical Systems

The unit was marked by centres and moderated by OCR.

The following points need to be considered:

- Centres are reminded that for 2012 onwards there is a new workbook and this must be used.
- It was clear that the new format helped learners to structure their ideas in a more logical way.
- Some centres are photocopying pages from the workbook and then submitting them loose or glued in the workbook. Learners must use only the pages in the workbook to present their work with space provided at the back of the workbook for additional photographs and extra supporting material.
- It was evident that learners were able to complete all sections of the Design Challenge within the time allowed.
- Centres are still not entering the mark in the boxes at the end of each task. These marks must be entered in ink not pencil.
- From the work submitted it was evident that learners had undertaken a number of teaching and learning activities to develop their knowledge and understanding of electronic and electrical systems prior to undertaking the Design Challenge; centres are to be congratulated on this.
- Photographic evidence varied in quality. Centres must ensure that the photographs are clear enough for all the detail in the circuits to be seen and that they are securely glued into the workbooks.
- Annotating their photographic evidence would allow learners to gain access to the full mark range. There was little or no annotation in some of the work presented.
- It is encouraging to see centres devising their own design challenges. Centres are advised that the challenge must have enough rigour to allow learners to show their full potential.
- Based on the evidence of the prototypes and final solutions all centres were able to provide learners with access to a full range of components and equipment.

## Assessment Criteria 1

In response to the Design Challenge all learners were able to apply their knowledge of electronic and electrical principles to propose possible Input, Control and Output components for the design of their circuit to varying degrees of sophistication.

Learners should be reminded that they need to identify safe working procedures for tools, equipment and manufacturing processes; these should be appropriate to their selected proposed circuit and the design room or workshop used.

Most learners were able to describe generic safe working procedures but to gain marks in the higher band also needed to consider the needs of others and give specific details of this in their workbook.

## Assessment Criteria 2

Most learners were able to describe the properties of at least three components. However a larger range is required to gain access to the higher band marks.

It is important that learners justify their selection based upon component properties, principles and values if they are gain marks in the higher band.

They also need to justify their selection of component values and component types.

All learners were able to produce an initial circuit diagram to varying levels of sophistication.

### **Assessment Criteria 3**

It was disappointing to see some learners only using CAD prototyping systems to develop their final solution. It is clearly stated in the workbook that at least two different prototyping systems are required.

It was evident that centres supplied their learners with a full range of tools, components and equipment to allow them successfully to complete this task.

Producing the PCB between tasks did not seem to cause any problems for centres.

Centres are reminded of the importance of taking good quality photographs throughout both these tasks. This is important as it allows for accurate assessment of the learners work.

Learners are permitted to glue extra photographs to support these tasks at the back of the workbook.

### **Assessment Criteria 4**

Most learners were able to devise simple tests to confirm correct operation of their device.

This often involved physically testing the device in a test rig to see how it performed.

Whilst this is an important part of testing their device they also need to use test equipment to verify the performance of different parts of their circuit.

It was also evident that some learners were not familiar with electronic bench testing methods.

Learner's performance would have been improved if they had used calculations to predict circuit test data and the possible use of alternative components.

Learners should be guided to use their test results to identify circuit modifications to enable correct operation.

## Unit F553 Manufacturing Engineering

The unit was marked by centres and moderated by OCR.

The following points need to be considered:

- It is anticipated that learners will have undertaken directed activity with a degree of autonomy to achieve their outcomes and accept responsibility in a team context. This was not evident in some of the learners work.
- The use of screen shots would have been useful where CAD and CAM was used. These could have been developed with detailed supporting notes and annotation.
- The use of annotated real time photographic evidence could be used in providing evidence in all of the assessment criteria.
- It is recommended that learners should divide their folders into sections that follow the assessment criteria. Detailed information can then be found in the specification for each section. It also ensures that all sections are covered.
- A number of folders showed the same type of presentation with use of material common to the centre. In general terms, the centre should be empowering individual learners to take charge of their own learning and development.

### Assessment Criteria 1.1

Some learners did not present enough evidence of how they had made a significant contribution to the detailed plan of manufacture of the product. The implication of this was that they could not achieve marks in the top band.

Learners needed to explain, in depth, how they had made a significant contribution to a detailed plan of manufacture.

This should include:

- all preparation, processing and assembly stages
- the sequence and timing of stages
- critical production and quality control points
- production and quality control procedures
- allocation of roles and responsibilities
- Learners should have also provided some evidence of how they suggested additional and/or alternative methods of manufacture based on their own knowledge and experience.
- This was not evident in some of the work. Some of the learners used the same descriptions, flow charts and images in their work.

### Assessment Criteria 1.2

Some learners did not evidence how they as individuals had been instrumental in ensuring the success of the team.

Some learners needed to show how they co-operated with others in reaching agreement in order to achieve the desired outcome.

This should include evidence of:

- allocating roles and responsibilities, based on the strengths and weaknesses of each team member
- setting and agreeing individual and team targets

- ensuring good communication between team members
- ensuring that team members were motivated
- creating an appropriate working environment
- considering health and safety issues in relation to the practical activities to be undertaken

The evidence could include minutes of meetings, a diary of events, written notes and/or a video of team meetings.

Witness statements are not acceptable.

### **Assessment Criteria 2.1**

Learners needed to design, describe, select and use quality control checks for the manufacture of the component. They also needed to show how they used actual and statistical testing methods. To gain marks in the higher band learners needed to describe, in depth, how they:

- selected and used six different quality checks for the manufacture of the product using a CNC machine
- inspected and compared samples of the product materials at the critical control points specified in the plan
- had fully detailed appropriate quality control checks using actual and statistical testing methods
- produced a detailed justification of alternative methods using the gathered statistical data.

### **Assessment Criteria 3.1/2/4/5**

Learners needed to fully explain procedures and detailed sequences of setting up a complex machining operation.

To gain marks in the higher band learners needed to explain, in depth, how they:

- step by step, programmed and set up the CNC machining operation
- reviewed the machining process on screen and how they acted on the outcomes
- manufactured five identical components
- planned a safe procedure and confidently employed that procedure
- produced a detailed set of instructions for a third party to undertake the same operations

It would have been beneficial if some of the above had been supported by annotated screen shots.

There was little evidence in some of the work that five identical components had been produced.

### **Assessment Criteria 2.1 and 3.3**

Some learners at best produced a set of limited data with only a basic analysis of the quality tests undertaken.

To gain marks in the higher band learners needed to produce a detailed report on the data findings of the quality tests.

They also needed to show how they interpreted the data in order to analyse the performance of the machining operations they undertook.

## Unit F555 Innovation, Enterprise and Technological Advance

The unit was marked by centres and moderated by OCR.

The following points need to be considered:

- Assessment of this unit requires that learners experience real events and work alongside people in a 'sector' context. It is not evident in some of the work that this has happened.
- Learners need access to specialist equipment to allow them to demonstrate their skills and to apply their knowledge. This was not evident in some of the work presented.
- Learners are required to complete this research assignment based on a chosen product. It is important that care is taken in choosing this product to allow learners full access to all the requirements for assessment.
- Learners should record all their research, findings, observations, analysis and individual conclusions in a workbook/report. It is important that learners have the workbook/report available for the duration of the unit as they are permitted to return to and add information to earlier sections in the light of any new discoveries.
- During their research and investigations the use of photographs, sketches, drawings and other presentation methods should be encouraged.
- It was evident that in some cases the work was undertaken as a classroom internet research exercise and the opportunity for real time sector experience was not evident.

### Assessment Criteria 1

It was encouraging to see that learners used a wide range of information sources to investigate their chosen product with regard to innovation and creativity. To gain marks in the higher band they must also fully justify their use of information. It is also important that learners acknowledge reference sources.

### Assessment Criteria 2

Learners must use a wide range of sources of information to investigate the chosen product with regard to the protection of the design.

To gain marks in the higher band they must fully justify their use of this information.

The report must also detail how protection of the product has been achieved and what this means in real terms, eg. illegal downloads.

Details of costs both in implementation and ongoing protection should be included.

The implications of these must be considered to gain marks in the higher band.

### Assessment Criteria 3

Learners must outline research activities and developmental work in detail. To gain marks in the higher band they must fully justify the financial decisions which have been made in relation to the product. They must also refer to specific details of the research, development and raising of finance when developing new products. It is important that learners use and reference the sources of information obtained in Assessment Criteria 1 for this.

In some of the work presented it was clear that all the learners had done was present downloads with no attempt to analyse this information. This approach is of little value.

#### **Assessment Criteria 4**

Most learners explained and justified materials and processes used in their chosen product but more detail should be provided when learners are considering the use of alternative materials and processes. The consideration of the implications of environmental and sustainability issues should be encouraged.

It is important that learners explain and evaluate the cause and effects of engineering technologies in the home, the workplace and the built environment.

#### **Assessment Criteria 5**

Most learners were able to explain the environmental and social impacts of engineering and the importance of the sustainability of resources.

To gain marks in the higher band all explanations must relate to the chosen product.

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