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# **GCE EXAMINERS' REPORTS**

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## **DESIGN AND TECHNOLOGY AS/Advanced**

**SUMMER 2016**

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### **Annual Statistical Report**

The annual Statistical Report (issued in the second half of the Autumn Term) gives overall outcomes of all examinations administered by WJEC.

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**DESIGN AND TECHNOLOGY**  
**General Certificate of Education**  
**Summer 2016**  
**Advanced Subsidiary/Advanced**  
**DT1 - PRODUCT DESIGN**

The paper was well received by candidates and the performance was consistent with previous years with regards to Section A, however Section B responses were considered to be better than had been shown in previous years. This indicates that centres have acted upon the advice given last year addressing the need for candidates to show more in-depth subject knowledge and its application to Product Design within their essay responses.

Candidate's use of terminology and technical language together with knowledge of materials and manufacturing processes is again improving with a number of scripts demonstrating this in their responses within Section A.

In Section B there is a clear indication that the essay responses generally require more structure and planning, whilst ensuring that ALL elements of the question are covered. The better responses also show candidates using products as examples to illustrate the context of the question.

Centres should continue to advise candidates to use the mark allocation indicated at the end of each question to guide the depth of response required and manage time effectively.

Centres should also continue to advise candidates to read the front of the examination paper carefully and add the correct number of questions along with the question number to their answer booklet in the order they are attempted.

Centres should also be advised to remind candidates that answers could be amplified with sketches and/or diagrams where appropriate.

**General points**

- There were less instances of rubric where candidates answered all questions on the paper.
- Candidates should be advised to read the question carefully in order to ensure that all elements are understood and are also included in their response.
- Where candidates are asked to select a number of responses from the question, there are an increasing number of candidates answering the entire question instead. e.g. select two responses from three.
- There were a number of instances where the responses throughout Section A were not detailed enough to gain the higher level of marks.
- Well-planned and structured responses (particularly in Section B) score well. These responses contain clear, and specific details relating to the question. They also show accuracy in terms of spelling, punctuation and grammar. An increasing number of candidates require more structure and planning in order to organise information clearly and coherently.

- The length of responses in some cases were too short to show any real depth of understanding.
- Candidates should be discouraged from using bullet points and extended prose should be used within Section B essay responses.
- Generic terms, particularly in naming materials (together with their characteristics or properties) are still used by candidates and are therefore not given credit. e.g. wood, plastic, metal, as opposed to oak, polypropylene and steel.
- Section A responses continue to improve however the weaker candidates continue to provide very brief responses in Section B and are consequently not achieving beyond Level 1. This indicates a decrease in candidate's breadth and depth of subject knowledge in Product Design.

## Section A

### 1. **Smart materials and composite materials are often used to manufacture modern day products.**

(a) **Identify one smart material and describe the advantages of using it in a named product.** [4]

(b) **Identify one composite material and describe the advantage of using it in a named product.** [4]

A popular question in this section, but there was some confusion between a smart material and a composite material. A lot of weak responses gave very general answers but did not give a clear advantage as a reason for selecting the material. The better responses demonstrated their knowledge of both categories of materials, and could justify their choice using a specific properties and could also give a product and its use as an example. In most cases the stronger candidates answered both parts of the question very well.

### 2. **Patents, Copyrights, Registered Trade Marks and Design Rights are all forms of protection granted by the Patent Office.**

**Explain the features and level of protection of any two of these with reference to specific products.** 2 x [4]

One of the most popular and well-answered questions within Section A. The majority of candidates were able to describe the features and level of protection that each type of Intellectual Property has very well. The better responses displayed in depth knowledge in its application and also provided examples of design for each type in their responses. Weaker candidates could only provide one or two very general points with no explanation. Some candidates repeated themselves and did not show an understanding of the type of protection required to protect different designs. The stronger responses scored well in this question.

3. **All designers consider the use of ergonomics and anthropometrics in order to design successful commercial products.**

**Describe two examples why:**

- (a) **ergonomics principles are important in the design of products.** [4]  
(b) **anthropometrics data is important in the design of products.** [4]

A variable response in terms of the whole question. The majority of candidates were able to explain what ergonomics and anthropometrics are, but the explanation of the application of each in design was varied. A lot of responses showed confusion between the two and their application and importance to the design of different products. Some of the stronger answers scored well in this question.

4. (a) **State two benefits of making a physical three-dimensional model when developing a design proposal.** [4]  
(b) **State the benefits of making a final three-dimensional prototype prior to manufacturing.** [4]

A lot of candidates misread this question and answered both parts in the same way, mainly describing what a three dimensional model is and what a prototype is. A lot of candidates did not provide the context and application of each with the benefits that they provide at different stages of the design and manufacturing process. The candidates who did, scored the higher range of marks.

5. (a) **Name a finishing process that can only be applied during manufacturing to a named product and explain why this is appropriate.** [4]  
(b) **Name a finishing process that needs to be applied by the consumer after manufacture of a named product and explain why this is appropriate.** [4]

This question was generally well answered in terms of knowing what finishes are available for use by the consumer. The knowledge of processes applied during manufacture was generally quite vague or not appropriate. Very few candidates had the higher range of marks for this question as they failed to provide suitable reasons for the suitable finish they had described. Candidates need to read the questions very carefully as it was obvious again that candidates had not read or fully understood the content of the question. The weaker candidates only answered two parts or even only one part of the question.

6. **Reverse Engineering involves the disassembly of a product.**

**Explain in detail how product disassembly benefits the designer.** [8]

A good number of responses were received and generally scored well. Candidates were able to describe the term reverse engineering and could relate this to product disassembly. The better responses gave examples of products in order to illustrate their answers and provided detailed explanations of the benefits to the designer. There were very few weak responses to this part of the question. A lot of candidates did this question very well and scored high marks for their responses. The weaker candidates failed to provide the benefits to the designer whereas the stronger candidates displayed their depth of subject knowledge in this question.

7. (a) Explain why bought-in or standardised part-assembled components are used when manufacturing products. [4]
- (b) Describe one advantage and one disadvantage of using bought-in or standardised part-assembled components to the designer or manufacturer. 2 x [2]

This was one of the most popular questions and was generally answered very well. Candidates could describe and give examples of bought in standard parts relating them to a product. The best answers linked this to Just in Time along with suitable advantages to the manufacturer of using them. There were very few weak responses to this question.

8. **The use of Computer Aided Design (CAD) and Computer Aided Manufacture (CAM) has now become an integral part of the design process for both designers and manufacturers when creating products.**

- (a) Describe the benefits of using Cad to the designer. [4]
- (b) Describe the benefits of using CAM to the manufacturer. [4]

This was a popular question from the exam paper in Section A. It was also one of the best answered questions. This gave candidates a good opportunity to score well if they chose this question. A good number of candidates attempted this question and successfully responded to the two areas. They were able to distinguish between the two and could give the benefits to the designer and manufacturer. Weaker responses gave a description of CAD/CAM followed by their application but missed out the benefits of their use. The best responses used different products to put the benefits of CAD/CAM to the designer and manufacturer into context.

## Section B

An increasing number of essay responses showed weaknesses generally with a lot of essay responses lacking structure and coverage of the whole of the question.

9. **Production lines rely on getting the right material or component delivered at the right time and place. This is often referred to as “Just in Time.” (JIT)**

**Describe the importance of this and explain how it is achieved along with the advantages to the manufacturer. Use examples of products to fully explain how this principle is used to its full effect. [30]**

This was a popular question in this section where a good number of candidates scored well. Candidates could clearly explain what "Just in Time" is and how and why it is used. The better responses gave information about its origins and could clearly describe its importance to the manufacturer of products. The better responses linked everyday products to the strategy and could describe how manufacturers can save on storage space and manage waste more effectively as a result. The weaker responses did not provide sufficient details of the advantages to the manufacturer in order to illustrate the principle to its full effect. Quite a few candidates scored marks in the highest mark ramp for this question. Those within the higher mark ramps wrote essays that were well planned, showed structure and also were able to show their in-depth knowledge within this question.

**10. Sustainability policies require the designer to consider the importance of material selection and product disposal.**

**Discuss the importance of this statement when developing new products [30]**

This was the least popular question in this section. The best responses were well planned and focused on discussing the validity of the question using a range of products. The better responses also had extended writing and used key technical terms and vocabulary carefully executed using grammar and punctuation. These candidates scored well. The weaker candidates provided much shorter responses that clearly lacked planning and missed a lot of key points relating to the question. A good number of students interpreted this in their own way and made their response illustrate their own opinions and beliefs. There were some excellent responses to this essay question and this was where planning was evident prior to the candidate's answer giving it structure and the use of technical vocabulary enabled candidates to access the higher levels of 3 and 4. Weaker response focused on one of the two parts of the question and did not really discuss the points indicated within the question. This showed that quite a few candidates had failed to read the question properly.

**11. Discuss how trends, styles and new technical capabilities have all influenced the design, production and sale of products. [30]**

This question was the most popular question in this section. Generally, products such as mobile phones, iPhone and iPad were used in responses. This was the better part of the essay and candidates were able to explain how the products have improved over time. This is a three-part essay and all parts should be included in the response. The best responses mentioned incremental changes to products and also planned obsolescence in relation to their responses. The better responses also showed a clear understanding of the question. Tastes and fashion trends of the target market were generally discussed well. A lot of candidates were aware of new technologies and could clearly link these to named products. However, the weaker candidates struggled with this question. There were some excellent responses to this essay question and this was where planning was evident prior to the candidate's answer giving it structure and the use of technical vocabulary enabled candidates to access the higher levels of 3 and 4.

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**DT1 - FOOD TECHNOLOGY**

**General Points**

There were a good number of centres who had prepared their candidates thoroughly for the AS Examination. Many candidates answered the questions well using good grammar, spelling and punctuation and were able to give both relevant and appropriate answers to their selected questions in both Section A and Section B. However some candidates were entered for the examination that appeared not to have adequate subject knowledge to enable them to be successful; some displayed a very basic knowledge and understanding. It is evident that many students are inexperienced in answering the extended essay questions and should be made aware of the importance of a focused response. Candidates should be encouraged to practice examination questions under timed conditions and should be taught to refer to the mark allocation for each question. Most candidates this year answered the required quota of questions. Centres should advise candidates to read the front of the examination paper and to record question number to their answer booklet in the order that they are attempted on the front of the answer paper.

**Section A**

- 1. Describe and explain how modified starches are used in the development of food products. [8]**

This question was a popular question. Many candidates discussed modified starches but few explained in *detail* how they were used in food products. The most popular products referred to were instant desserts and pot snacks. Some candidates discussed other smart foods including functional ingredients, encapsulation ingredients and fat replacers and which did not form part of the question and consequently the response.

- 2. Food materials such as egg and sugar have different properties.**

**Explain how the properties of these two materials affect the physical and aesthetic characteristics of named food products. 2 x [4]**

This was a popular question and answered well by some candidates. However only a minority of candidates was able to explain in *detail* the affect of the physical and aesthetic characteristics of named foods and was many candidates appeared to be confused between the two. Coagulation was the most popular property discussed for eggs and caramelization for sugars.

**3. Describe the benefits of high volume production within the food industry. [8]**

Some candidates who answered this question were confused as to what production method is classed as high volume, discussing batch production rather than mass or continuous flow production. Those candidates who referred to the correct high production method discussed a small range of benefits including raw materials being purchased in bulk reducing costs, non-skilled workers, quantities produced, and less waste. Few explained ratio of workers or use of specialised equipment.

**4. The use of Computer Aided Design (CAD) has become an integral part of the design process when creating food products.**

**(a) Describe the benefits of using CAD to the food technologist. [4]**

**(b) Describe the benefits of using CAM to the food manufacturer [4]**

This was question had some good responses. Many candidates were able to describe the benefits of CAD to the food technologist, mostly referring to graphics /art work on packaging and its use in preparing prototypes and in modeling. Many named specific software. Only a few candidates described how CAD is successfully used for communicating purposes between food technologist and client / manufacturer. A good variety of benefits of CAM were put forward by candidates including reducing human error, accuracy, increased productivity. Not many candidates referred to monitoring production schedules / stock rotation or its use in HACCP.

**5. Minerals are essential for good health.**

Select **two** different minerals and for each explain:

**(a) Why it is essential for good health. 2 x [2]**

**(b) The effect of a deficiency in the diet. 2 x [2]**

This was a popular question. Many candidates answered this question well; the most common minerals named in responses were calcium and iron. Some candidates were unsure of the reasons why the named minerals were essential for good health; most candidates who answered the question were able to give explain at least one effect of a deficiency in detail.

**6. Disassembly is an important aspect of product analysis in food technology.**

**Discuss the benefits that a food technologist would get from taking an existing food product apart. [8]**

Candidates who answered this question were able to draw on experience gained from completing their coursework to help them to respond. Many candidates discussed how the product looked, the ingredients used and a products measurements/dimensions. Few discussed legal and health issues, special claims made by on the packaging, how the product was made or referred to the above and below the line criteria (which could have been a major part of their coursework). Very few candidates approached the question from the point of a food technologist referring to how product analysis would benefit them as was requested in the question.

7. (a) **Explain, giving examples, what you understand by standardised food components.** [4]

(b) **State two reasons why food manufacturers would use standardised food components.** 2 x [2]

This question was a popular question and was largely answered well. Candidates were aware of how and where standardised food components are used successfully by food manufactures and could give examples as to why food manufactures use them. Pizza bases/ grated cheese and sauce toppings were the most popular examples given of standardised components. Some candidates who answered this question appeared to be unaware of what standardised components are and discussed standardised measurements (weights etc) rather than the use of standardised components.

8. (a) **Describe one experiment or test which could be carried out to investigate how food materials behave and interact.** [5]

(b) **Explain how this investigation could help you in developing a new food product.** [3]

This question was not a popular question and surprisingly, not answered well by many candidates. A small number of candidates were able to describe appropriate experiments or tests to show how food materials interact or explain how this could help in designing new food products. Most examples referred to the use of fats or flours in cake making but candidates were largely only able to give a limited explanation.

## **Section B**

Most candidates attempted to answer one of the essay questions. Some candidates produced good answers showing sound depth of knowledge. Many candidates however seemed to struggle with the demands of answering the essay question, indicating that they had not been provided with opportunities to complete practice questions prior to the examination. Very few candidates had planned out their essay and many were of inappropriate length.

9. **Food production lines require sufficient materials and components to be available at the right time and place.**

**Explain how this can be achieved and discuss the advantages to the food manufacturer.** [30]

This was answered well by some of the candidates who attempted this question and who were able to explain the advantages to the food manufacture for ensuring that materials and components were available when required. Many of these candidates discussed the 'Just in Time' method of production and were able to explain the main features of this system including efficient and faster manufacturing systems, no loss of material costs, less storage space, appropriate ordering systems and increased profit margins. Some candidate however discussed mass production or batch production methods but omitted to respond to the question stem about materials and components being available at the right time and place. Practice in reading examination questions and seeking out the key requirements should be encouraged by centres.

- 10. A significant percentage of the UK population ignores the health warnings issued regarding the effects of poor diet.**

**Discuss, giving clear examples, how food manufacturers have designed their food products to encourage consumers to make healthier choices. [30]**

This was the most popular essay question on this year's paper. Many of the candidate's responses offered a wide range of responses discussing the effects of poor diet and health warnings that have been issued. However, only some candidates were able to give the required examples of the way in which manufactures have designed food products to encourage consumers to make healthier choices. Answers included nutritional labelling, supermarket healthy options, specialist foods and specific campaigns such as 5 a day. Some candidates who answered this question had very little factual knowledge of food products that have been produced to encourage consumers to make healthier choices. Centres should encourage their candidates to read the question carefully so as to avoid missing out essential requirements to the question.

- 11. Understanding and applying food safety practices is vital to the food manufacturer.**

**Discuss how food manufacturers and food handlers apply safe working practices at all stages of production. [30]**

This question was answered well by some candidates who were able to discuss how food manufactures apply variety of safe working practices during production. Most candidates discussed general food safety and hygiene practices well, many included relevant discussion about HACCP, explaining what it is and its application. However very few candidates referred to the Food Safety laws and expectations, the role of environmental health officers and enforcement issues or the keeping of relevant records such as cleaning schedules, training records or temperature logs.

## DESIGN AND TECHNOLOGY

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## DT1 - SYSTEMS AND CONTROL TECHNOLOGY

### General Points

Only a limited number of candidates were entered for this course and very few attempted the questions that were specific to systems and control, the production of reliable and accurate statistical evaluation is very difficult.

**In Section A** four questions were subject specific.

Question 1 was attempted by five candidates. Most were able to identify smart materials but the responses lacked clarity in relation to the advantages that these materials are likely to provide. It is anticipated that candidates specialising in systems and control would have specific knowledge of advanced materials such as QTC and Piezoelectric materials.

Question 3 was answered by 50% of the candidates. Candidates still lack clarity in relation to the difference between ergonomic principles and anthropometric data. In general they were able to relate these issues to electronic or mechanical devices.

Question 4 was attempted by the majority of candidates. This question required a qualitative response and some candidates were able to produce justified answers.

It is disappointing that only two candidates attempted Question 5 as this presented an opportunity to demonstrate in depth subject knowledge and technical understanding.

**In Section B** Question 10 was attempted by one candidate.

In general the evidence available suggests that candidates avoided questions that require technical knowledge and detailed subject specific understanding of control systems. This must be regarded as a major area of concern for future development.

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## **DT2 - DESIGN AND MAKE TASK PRODUCT DESIGN/SYSTEMS & CONTROL TECHNOLOGY**

### **General Points**

I would like to begin this years report by thanking centres for their continued improvements in internal standardisation between teachers and across material areas. A number of centres have shown significant improvements especially in the standard and quality of making and in raised levels of creativity.

The choice of project is a concern with some centres allowing candidates to undertake large projects which are inappropriate at AS level. The choice of smaller smarter projects which play to the centres strengths and facilities are an effective way forward. It is essential that candidates are able to demonstrate high level making skills and standards of accuracy if they are to secure high level marks.

### **DT2 Extended Task**

#### **DESIGNING**

##### **Product Analysis and Research**

This was effectively used by many centres to enable candidates to develop a thorough understanding of area in which they were working.

Good work was exemplified by candidates undertaking first hand in depth analysis of relevant products based upon draft specifications. This approach ensured relevance to the subsequent design work and aided the composition of final specifications. When this was done well candidates developed a sound appreciation of the needs of the target audience.

Effective analysis also enabled candidates to more thoroughly understand the task ahead and to develop sophisticated final specifications that then underpinned the entire project. Effective use was made of establishing Unique Selling Points as a part of this process. Where centres relied solely upon virtual product analysis the relevance and depth of the work was limited

##### **Developing a specification**

Where quality product analysis and research had been undertaken candidates showed a thorough understanding and their final specification effectively addressed the main issues of the design task. Good practice showed the use of a hierarchy and included measurable criteria. Where this was not done well it tended to be the cause of significant difficulties throughout the project.

Good specifications were relevant, concise and meaningful and helped to focus subsequent design activity. A common problem was still an over reliance on centre generated check lists which students used to create lengthy lists of very general and often irrelevant specifications.

## Generating and Developing Ideas and Proposals

Sketchbook work is now firmly established and good practice was evident, it must be stressed however that there is no value in scanning sketchbooks into folios. Creative exploration of a range of design ideas is central to this task. Good practice at this level includes both drawing and rapid modeling. Modelling and testing is an essential development tool both through traditional hand modelling and through 3D modelling software. Clear reference was made back to the design specification to evaluate ideas and proposals and also to establish a clear direction for the project. Architectural projects should show evidence of functional analysis of the volumes that make up the building. It is important to show an appreciation of how a building might function not merely how it might look. Buildings with no evidence of appropriate entrances or doors clearly demonstrate the failings that can occur if this is not carried out.

## Detail Designing

This was an area which still causes some difficulties mainly due to assessment criteria not being fully read and understood. **Effective detail design must have all the information needed for the product to be made by a third party.** Where the exact form of this is a cause of concern then reference should be made to the normal professional practice for the particular materials and approach. Good work must include all relevant dimensions and tolerances. Appropriate ICT should be used to present detailed dimensions of the final proposal to gain high marks. Parts drawings are expected if top marks are to be accessed. Textiles candidates made very effective use of Photoshop and CorelDraw to explore pattern and colour possibilities within their design development and used toiles and patterns to detail their designs. High-level work in textiles should show evidence of pattern development and not merely rely upon commercial patterns.

## Evaluating, Reflecting and Decision Making

This aspect was effectively dealt with by many centres. Where difficulties were encountered it was almost entirely down to poor specifications which failed to give sufficient focus. The criteria regarding objective comment from those with commercial or specialist knowledge was the main area of weakness. Some candidates made contact with professionals and retailers to provide additional objective feedback. End testing is a crucial aspect to help candidates to be more objective and to formulate effective suggestions for modifications.

## Communication / Key Skills

The candidates in some centres are producing folios which demonstrate high levels of creativity with very effective use of both hand based graphical work and rapid concept modeling together with highly developed CAD and CAM. This rounded approach is very effective and enables students to fluently develop design ideas by making the best use of both hand based work and computer media, information and manufacturing.

## MAKING

### Planning for Making

This area is now generally well done, but centres are reminded that marks can only be awarded for the use of appropriate project management systems coupled with detailed quality assurance and quality control measures.

## **Selecting and Testing Materials and Components**

If candidates are to access all the marks then in depth researching relevant materials data and undertaking experimental making is a sound way forward. Photocopies of materials data from the internet or textbooks is pointless. Real exploration of a small range of possible materials to see what can actually be done with them is valuable. Costings and fair testing should also be included here. Relevance is crucial and selection needs to be supported by data comparing a selected range of available materials is a sound approach.

## **Use of Materials and Processes**

The need for candidate's work to show increasing degrees of creativity and sophistication is one of the challenges of the specification. Where candidates have previously selected and tested appropriate materials and processes they are more likely to be better equipped to rise to the challenge here. A good example this year has been in the exploration and development of flexible components using the laser cutter to create bendable components from rigid material. Compact projects do have advantages in this section and enable candidates to demonstrate their making capability well and require proportionately less finishing than larger products.

## **Accuracy, Quality and Finish of the Design Solution**

This was exemplified by high quality accurately made and well finished products. Where projects such as architecture and graphics are undertaken then it is expected that the outcomes should be in line with the normal professional / commercial practice. It is essential that candidates produce architectural models that are to scale and of a complexity that clearly demonstrate the appearance and layout of the proposed building.

## **Functionality and Innovation of the Design Solution**

Products must function very well and show innovative aspects to secure high marks. Attempting to be innovative is a risky business where a product has failed to meet expectations despite a great deal of hard work and it demonstrates a degree of high level making skills and accuracy then up to eight marks may be awarded. The functional aspects of architectural projects are sometimes a real concern. The folio and model must show an appreciation of how the building will function.

## **Additional Notes**

Overall, the standard of making was similar to previous years with some good work being done. Many centres have adjusted the scale of products and focused on the materials and processes used; this has a positive effect on candidate's ability to earn marks. Good work demonstrated high level skills with significant progression from GCSE. Medium size products with a good range of processes offer candidates a greater potential of accessing all the marks. Identifying appropriate processes and working out ways of achieving quality is vital. Where a product relies upon significant numbers of commercial components then a cautious approach is essential.

In textiles fashion design the use of a commercial pattern is a perfectly acceptable as a starting point, but candidates need to move on by customizing, modifying and experimenting to develop a design which is much more original. The modified pattern and or toile are important evidence and are part of the Detail Design section. High level textiles fashion design work may involve original pattern design.

## Good Practice

There are a few key areas which are used to very good effect in some high performing centres which is useful to share within this report. All of the points that follow have a direct effect on the quality of the learning experience and on the ability of candidates to access marks.

- Establishing design tasks which relate to the market place and industrial practice e.g. how does a retailer target its products on particular consumers.
- Writing relevant, clear, wide ranging and well-structured specifications is vital.
- Linear approaches to designing tend to be very limiting and more flexible iterative approaches tend to be more effective.
- Boosting idea generation by integrating sketching and rapid modeling techniques into early designing can be very effective.
- Creativity can be nurtured by identifying and resourcing new processes, technologies and materials to encourage new approaches e.g. bag press laminating, laser cut live hinges, polypropylene sheet and frosted acrylic, LED lighting.
- Evaluating thoroughly, and getting the opinions of others, considering commercial potential and manufacturing requirements, testing by using or wearing are all valuable approaches.

The value of attending the WDA/WJEC Innovation Exhibition and INSET each year is considerable and provides an excellent way for both staff and students to access high quality work and thereby fully appreciate the standard which is required at both AS and A level. The Student Study Guide and seminars are very popular and help to make this a very rewarding visit. This is particularly valuable event for new centres.

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**DT2 - DESIGN AND MAKE TASK**  
**FOOD TECHNOLOGY**

**General Points**

The standard of presentation of coursework was generally high with most candidates presenting work in A3 folders. A few centres have encouraged candidates to present some of their work on A2 sheets for display purposes which is acceptable as long as it is clear where the work fits within the project. All centres are using some sort of sketchbook. The use of sketchbooks does vary quite considerably; in some centres their use seems to be reserved for collecting research, recipes etc, whilst elsewhere they are more extensively used. It is fairly common for there to be little actual sketching within the sketch books of Food Technology candidates. It is essential that candidates put across design ideas effectively in whatever form. It proves very difficult to clearly convey the vision of a final design proposal without including a diagram.

At AS, most candidates are doing plenty of research. The level of focus varies. On occasion it still appears that some candidates are doing research for research's sake. It is important that all research activity is relevant and well-focussed. Centres should not be fearful of, for example, omitting questionnaires if they are not really going to inform the decision-making and design work of their students. All candidates at AS have included product analysis and in some cases this is done to a very good standard. However, there are still occasions where a candidate carries out a product analysis on a poorly chosen product; one which is not directly linked to their brief. It is essential that products are chosen carefully, thinking not only about what kind of food it is, but whether it fits in other aspects: whether it is the right quality level, for example. On occasion, candidates are carrying out product analysis on several products which can sometimes over-burden them or dilute the quality of work they are achieving. On occasion, candidates include sections such as 'customer profiling' and it is not always clear how this benefits them, unless done very well.

At both AS and A Level, the quality of communication is frequently very good, with a wide range of communication techniques used to good effect. This often includes the effective use of ICT, including nutritional analysis, star diagrams, digital photography etc. Sketching, as already mentioned, is sometimes scarce in some projects. In others, the detailed nature of annotation of diagrams has made them very useful. It is essential that candidates communicate their design ideas effectively, by whatever means they choose.

On-going evaluation tends to be a further strength with many Food candidates. This year again, the thought process of many was very clear and they were explaining their decision-making as they went through the design process. Summative evaluations are often very detailed, frequently including user trials and the views of experts.

In many centres, design specifications tend to be one of the weaker sections. We are still seeing a number of generic points included on specifications or criteria which are very vague or which do not use measurable criteria when it would have been appropriate. It is fairly uncommon for design specifications to be of a high standard. It is disappointing to see a lack of creativity in some candidates in their design work. However, on occasion, interesting combinations and imaginative dishes are being created, though this is less common than would be hoped. On many occasions, candidates are developing ideas well. Many are considering a good range of options and trialling appropriately. Candidates are frequently discussing these trials effectively and showing how it affects their decision-making. Planning is often very good, with attention paid to quality control issues.

A number of centres are producing practical work of a very good standard with attention to detail and a high quality finish. It is clear that many candidates are benefitting greatly from the practical expertise of their teachers and making a good step up from GCSE to AS Level. In many cases, accuracy is high and candidates are using food materials to very good effect. Final products mainly function very well, but many lack creativity.

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**DT3 - PRODUCT DESIGN**

**General Points**

This paper was well received by candidates demonstrating a wide range in terms of quality of responses across all the set questions, resulting in a spread of marks. Candidate performance was consistent with previous years.

Although some candidates demonstrate very good awareness of product design and the development of specific products, centres are encouraged to include a wider range of designers and products for study at A level. Candidates who have been introduced to a range of different products during their courses clearly demonstrate the required knowledge and understanding and score well throughout the paper.

As with previous years there was a mixed response to the short answer questions with many candidates identifying issues regarding the question but not following up with justifications or exemplars. Candidates need to justify or enlarge on their responses in both Section A and Section B.

The necessity for candidates to analyse the requirements of each question in section C and subsequently plan a focussed response must be stressed. Similarly, the value of practice at past questions during their course cannot be over emphasised if candidates are to present extended responses worthy of A Level.

There are many candidates who fail to achieve above Level 2 marks in their essay responses. This is mainly as a result of not including the rudiments of the question in their responses and insufficient practice at writing essays.

**Section A**

1. (a) **Explain the term market segmentation.** [4]
- (b) **State the reasons why designers should be aware of market segmentation when designing specific products.** [4]

Good responses were able to explain clearly the term as the process of dividing a broad market and provide reasons why designers should be aware of potential purchasers, expectations within a market in relation to specific products. However the majority of responses failed to justify their responses in relation to specific products to gain the higher level marks.

2. **Describe how specific jigs and fixtures are used to increase speed and ensure accuracy when manufacturing products.** [8]

Candidates who scored well described clearly how the uses of jigs are used to provide repeatability and accuracy in particular manufacturing processes. Good answers also provided clear definitions of fixtures as work holding devices in order to perform a forming or machining process. Very few candidates included sketches or diagram to support their answers.

3. **The use of ICT has a significant effect on the design and manufacture of products.**

(a) **Explain the benefits of ICT in pre-production prototyping.** [4]

(b) **Explain the benefits of ICT within stock control.** [4]

The benefits of ICT in pre-production prototyping was answered well demonstrating that the majority of candidates understood aspects such as visualising a product through to planning for component production. Many responses relating to stock control merely provided a benefit to shops or retail outlets and did not relate their response to manufacturing products.

4. **Explain how quality standards which are developed by the BSI (British Standards Institute) and ISO (International Organisation for Standardisation) have a positive effect on specific named products.** [8]

A relatively small number of candidates attempted this question. Few were able to explain clearly how quality standards have a positive effect on products giving consumers confidence in specific named products. However some responses made good references to electrical products, play equipment and safety components to exemplify the positive effects of quality standards.

5. **Describe in detail, using diagrams where appropriate, a permanent and non-permanent method of joining specific materials.** [8]

The responses received were generally good and candidates described appropriate processes (using a range of materials) to join materials permanently and non-permanently. A number of candidates however failed to provide sufficient detail in their response thus differentiating between a permanent and non-permanent method of joining.

## **Section B**

6. **Explain what you understand by qualitative and quantitative testing in the selection of materials when developing products.** [8]

The majority of candidates understood the general definitions of qualitative (in being subjective) and quantitative (objective), but did not explain clearly their understanding in relation to selecting materials when developing products. This lack of detail in their responses limited the number of marks available to them. A limited number of responses were able to access the higher marks by providing clear explanations i.e. selecting materials and understanding qualitative criteria and also describing measurable criteria whilst using quantitative criteria.

7. **Describe the important features of a design process that are used to design and make successful products.** [8]

Few responses were able to clearly define the principles of a design process and did not score well. The clear definitions and references to definitive steps or stages were not evident in the majority of responses who also failed to relate their descriptions to the development of products. Few candidates provided details from the initial design need and brief to the delivery of the product for a specific market.

8. **Describe a five step risk assessment plan appropriate for a named manufacturing process.** [8]

Responses demonstrated that this process is generally well understood by the majority of candidates although some failed to access the higher level marks because they failed to relate the plan to a manufacturing process. A small number of candidates merely described health and safety precautions relating to a process.

9. **Describe a specific process of forming a product or component in a named plastic.** [8]

Many responses were able to describe clearly the stages in forming a specific product and included clear sketches to support their answers i.e. blow moulding a PET or PVC bottle through a process of injection, blowing and ejection – which included full descriptions of the processes within each.

10. (a) **Explain how concurrent engineering is used within product development.** [4]

- (b) **Explain how reverse engineering is used in the design and development of products.** [4]

Concurrent engineering as a process which designs and develops products simultaneously rather than consecutively is not well understood with very few candidates scoring well. Reverse engineering as a process of discovering the technological principles of a product is generally understood by the majority of candidates. Consequently very few candidates scored well across the whole question.

### **Section C**

Candidates planning and structured responses, together with answering specific areas within the question do score well. Weaker responses do not respond to the specific requirements within the question, lack any structure and are much too brief.

11. **“Truly elegant design incorporates top-notch functionality into a simple, uncluttered form”**

*(David Lewis 2006)*

**Discuss how this statement is relevant to the work of a contemporary designer and the impact of the products that he/she has designed.** [26]

Candidates responded well to this question and the responses that were able to access the higher level marks discussed in detail the work of a contemporary designer in relation to the quotation. However, as stated earlier candidates will need to study a wider range of designers and products, showing how products and designers are influencing contemporary product design.

- 12. Describe the benefits and effects that composite materials have on the success of a particular product in terms of form, function and reliability. [26]**

Few responses demonstrated thorough knowledge of a range of composite materials and their effects on the success of products. Many responses merely described the function in terms of lightness or toughness without describing the benefits of composites in terms of reliability and being able to form the material.

- 13. Discuss the advantages of planned obsolescence within the life cycle of specific products to the consumer and to the manufacturer. [26]**

Planned obsolescence is when a product is deliberately designed to have a specific life span (usually a shortened one). Many responses demonstrated clear understanding of the term but did not relate their discussions to the advantages for the consumer or manufacturer. Stronger responses did detail advantages for the consumer in keeping up with developing technology and cost of production in terms of the manufacturer.

- 14. Discuss how manufacturing methods, product life and environmental factors relate to the design and manufacture of sustainable products. [26]**

Responses were required to consider the three areas (manufacturing, product life and environmental factors) – in terms of sustainable products. The majority of responses failed to score well as they merely discussed the general need for sustainable products

- 15. Explain what you understand by quality control and quality assurance, and discuss their importance to the manufacturer, consumer and the environment. [26]**

Quality control as a process, which checks for accuracy and safety of a product (and meeting consumer and environmental expectations) is not clearly understood by candidates. Quality assurance as a process in developing products and services is equally misunderstood. The majority of responses did not differentiate sufficiently between the two areas (and include their importance to manufacturers, consumers and the environment) in order to access the higher level marks.

**DESIGN AND TECHNOLOGY**  
**General Certificate of Education**  
**Summer 2016**  
**Advanced Subsidiary/Advanced**  
**DT3 - FOOD TECHNOLOGY**

**General Points**

The number of candidates taking DT3 has decreased this year with several centres having very small numbers. There were a number of very strong candidates and it was evident that many had received excellent teaching and guidance. Many candidates were clearly reflecting carefully on their coursework experiences, where appropriate, to help them answer questions in the exam. The use of technical terminology was good in many cases.

It was pleasing to see an increase in the use of essay plans which clearly benefitted candidates. Essays were generally of a reasonable length and covered a good range of factors. Many had structured these extended responses well and attempted to include evaluative comment, as appropriate. There were only very limited examples of candidates failing to complete the correct number of questions.

- 1. Evaluate the use of packaging as a marketing tool for both economy and luxury food products. [8]**

The most common responses focussed on use of typography, colour and photographic images. Some candidates also discussed the use of packaging materials / sustainability. Many responses lacked detail. A minority of candidates answered the question about using packaging more generally to encourage consumers to make purchases rather than focussing answers specifically on economy and luxury food products. A few wrote about the physical functions of packaging which gained no marks.

- 2. Salmonella, Staphylococcus, E. Coli and Clostridium are examples of micro-organisms which can threaten food safety. For any one of these:**

- (a) Outline the main sources of infection. [3]**

- (b) Describe precautions taken by food manufacturers to avoid contamination. [5]**

Answers were generally pleasing to this question with a good level of knowledge and technical vocabulary used effectively. Salmonella was by far the most commonly chosen bacteria, though Staphylococcus was fairly popular also. Many candidates demonstrated excellent understanding and were able to write in detail about the precautions taken. Low level responses tended to focus on hand washing and staff uniforms etc.

**3. ICT is used extensively in the design and manufacture of food products. Explain the benefits of ICT in:**

**(a) Nutritional analysis during the development of food products. [4]**

**(b) Stock control during the manufacture of food products. [4]**

There were many good responses to this question, with many candidates gaining 6 or more marks. The first part of the question was generally answered better than (b) with a clear understanding and knowledge of the use of ICT in nutritional analysis, quite possibly gained from the direct experience of candidates through their coursework. Some had only a very basic knowledge of stock control or failed to answer the question properly, instead discussing the use of bar codes on food packaging in retail.

**4. UHT (Ultra heat treatment) processing is used as a method of preservation for milk.**

**(a) Briefly outline the process of UHT. [2]**

**(b) Describe the effect on microbial levels and shelf-life. [3]**

**(c) Evaluate the effect on the physical, sensory and nutritional properties [3]**

This was not a popular question and of those who did answer it, very few were able to offer many technical details of the process of Ultra Heat Treatment. The effect on microbial levels and shelf-life was answered better than the physical, sensory and nutritional properties. Most focussed on vitamin loss. Overall, responses to this question were disappointing.

**5. (a) Outline the main requirements placed on food businesses by the 1990 Food Safety Act. [4]**

**(b) Describe four actions available to the enforcement authorities if food businesses fail to meet these requirements. 4 x [1]**

Very few attempted this question and generally responses were weak. Of those who answered it, only a minority were able to outline the main requirements of the Act. Many wrote vaguely about food hygiene practices. The second part of the question tended to be better with most able to describe accurately at least some of the actions available.

**6. Explain what you understand by qualitative and quantitative testing in relation to the selection of food materials. [8]**

The quality of responses to this question varied widely. Some demonstrated an excellent understanding of the topic, using technical terminology effectively and using useful examples, whereas others seemed to have no real concept of the terms.

- 7. Describe the important features of a design process used to design and make successful food products. [8]**

Again, answers varied greatly. Most were clearly reflecting on their coursework experience and some did so very effectively. The better answers included plenty of detail for the different stages of the process and illustrated their responses with appropriate examples.

- 8. Outline the advantages and disadvantages of one-off production to the manufacturer of a named food product. [8]**

This was quite a popular question. Many had a good understanding of the topic of one-off production, but some failed to focus their response on advantages and disadvantages to the *manufacturer*. Some instead discussed the scale of production from the consumer's perspective. Several candidates gained no marks for their responses as they included no relevant information.

- 9. A food technologist may choose to use a particular fat, based on a number of factors.**

- (a) Outline the nutritional characteristics of two different named fats. 2 x [2]**

- (b) For any one of these fats, describe two properties which make it suitable for use in particular food products. 2 x [2]**

Of the limited number of candidates who answered this question, most had a good level of knowledge and understanding. Explanations were generally clear and some were able to include detailed scientific information about the types of fats and how they are used. The use of technical vocabulary was generally good.

- 10. Evaluate the use of one specific SMART food material in named food products. [8]**

This question was reasonably popular and generally answered well. Modified starch and Quorn were the most popular materials chosen. Answers generally included a good level of detail and candidates on the whole evaluated the use of the material within food products effectively.

- 11. The price charged for a food product is not simply based on the costs of production.**

**Discuss the factors which influence how the prices of food products are determined. [26]**

Many were able to discuss a good range of factors affecting the price of food products.

Many wrote in depth and explained themselves clearly. Economic factors such as elasticity of demand were sometimes included, though the use of technical vocabulary seemed limited in this area. A number of candidates included information about 'the 4 Ps', with only a very small minority focussing too greatly on this at the expense of other factors. Many candidates achieved marks within the top two marking bands.

- 12. Discuss the reasons why food technologists and manufacturers may aim to achieve maximum vitamin and mineral content in food products and describe the possible methods used to achieve this. [26]**

Very few attempted this question and answered tended to lack focus. Some failed to answer the question properly, instead just providing information about the functions of vitamins and minerals.

- 13. Discuss how food products have been adapted to meet the specific needs of a range of target markets. [26]**

This was a popular question with a wide range of responses, both in terms of the range of factors discussed and the quality of the work. Most included information about gluten free products, though their knowledge was limited, with very few providing actual details of modifications made to products to provide for this target group. Generally, knowledge appeared to be limited to knowing that gluten free products exist and very few were able to offer any information about what is used in place of wheat. Other popular responses included weight watchers, probiotics and vegetarian options. Many included a good range of factors.

- 14. Discuss the factors to be considered when designing and manufacturing sustainable food products. [26]**

This question was perhaps less popular than I had anticipated, but it was generally done to a very good standard. A very good range of factors were included by many and candidates frequently demonstrated a very good knowledge of sustainability issues.

- 15. Describe the process of quality control and quality assurance and discuss their importance to the food manufacturer, consumer and the environment. [26]**

This was not widely chosen and was generally not done to a good standard. Very few demonstrated that they were able to differentiate between quality control and quality assurance and many answers were very vague, perhaps including some examples of quality control measures that might be put in place. There was only very limited discussion of their importance and this tended to focus on the consumer alone in terms of receiving a quality product, generally overlooking the manufacturer or the environment.

**DESIGN AND TECHNOLOGY**  
**General Certificate of Education**  
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**DT3 - SYSTEMS & CONTROL TECHNOLOGY**

**General Points**

Systems and Control Technology remains a small entry at A2 compared to Product Design. This report focuses on the performance of candidates attempting the questions relating to the Systems and Control knowledge and skills outlined in the specification. Additional questions, common with DT3 Product Design, are reported on previously.

**Section A**

- 1. Describe the benefits and limitations of using CAD when developing control systems for products. [8]**

A very popular question, not surprisingly so with the role of the Design and Make task covered by candidates during this course. Many excellent benefits of using CAD, including the quick designing, development and testing of control systems, together with additional advantages of saving, communicating designs electronically, links to global manufacture and paperless systems. Limitations are slightly more challenging, but candidates understood that virtual systems sometimes react differently to 'real life' components. Additionally, the costs of software for specialist modelling and testing systems can be extensive, along with specific skills and training required to use specialist CAD systems.

- 5. Describe in detail two methods of prototyping electronic control systems in a school workshop naming specific tools and equipment required. [8]**

Most candidates answered this, and selected protobloc / breadboard method of modelling and also the use of stripboard to develop prototype electronic systems. Some descriptions lacked depth and detail, which limited the marks awarded. This was a poorly answered question in the main, which was disappointing for such a core element of the course and teaching specification.

**Section B**

- 7. Describe, using diagrams, the 'systems approach' to problem solving. [4]**

**For a named product or process, illustrate how the stages can be presented in the form of a flowchart. [4]**

This question proved a very unpopular choice for candidates. A fundamental aspect of planning and sequencing 'systems' type tasks, this question provided an opportunity for candidates to compare block diagrams and flowcharts in terms of their use and diagrammatical forms. For those attempting this, the latter part was not responded to very well, with some difficulties in naming the product or process, which limited the marks awarded.

- 9. Describe the material properties of a named semi-conductor that make it suitable for use in specific product/s that you have manufactured during your studies. [8]**

This proved very unpopular despite all candidates experiencing this during the course. The requirement for very specific knowledge of a semi-conductor perhaps discouraged some candidates. Also, generally the standard of knowledge and understanding of components can sometimes appear very limited, particularly lacking in the reasoned decision making for using selected components in project work.  
Section C

- 12. Describe the benefits and effects that programmable microcontrollers have on the success of a particular product in terms of form, function and reliability. [26]**

No candidates attempted this essay question.

- 14. Sustainability and energy efficiency can often be driving forces for designers of control systems for products.**

**Discuss how sustainable and energy efficient control systems have impacted on the success of named products, and the influence this has had on the market. [26]**

This did not prove a popular question, with those selecting this responding fairly well. The coverage of both sustainability and energy efficiency was sometimes lacking the depth and analysis required. Candidates should be reminded to exemplify statements with named products where possible. Responses included typically mobile phones, laptop, IT equipment as products when discussing re-usability of components. Further analysis showed understanding of separating products at the end of useful life to reclaim materials for recycling and reprocessing. As expected, the latter part of the question, as always, is more likely to be answered poorly. Candidates are reminded to read questions during and after composing responses in order to ensure that they have fully met the premise and covered all aspects fully.

## **DESIGN AND TECHNOLOGY**

### **General Certificate of Education**

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## **DT4 - PRODUCT DESIGN/SYSTEMS & CONTROL TECHNOLOGY**

### **General Points**

Centres are demonstrating continued improvements in aspects of administration, internal standardisation between teachers and across material areas where necessary.

The preparation for external moderation at centres in general is efficiently undertaken with the work of all candidates effectively displayed in a quiet environment with the supporting administrative documentation. Centre annotation on the DT4 cover sheets is comprehensive and helpful in the moderation exercise in some centres and demonstrates, very often, sound understanding of the assessment criteria resulting in consistent and accurate application across the strands.

Moderators have again noted the challenging designing and making experiences undertaken by candidates on their visits to some centres - the high standards achieved for DT4 compare favourably to previous years indicating high quality products and depth of studies. We are seeing increased use of 3D printing used in the design and development stages and indeed in the final solutions. In the best examples we are able to access relevant CAD files where the process is used to its full potential.

As in DT2 we continue to see student projects in a number of centres that are simply not challenging enough to be considered as advanced level work. A good reminder of the level of challenge required to get a good grade at Advanced Level are the many examples from the Innovation Awards that have been produced over the years.

Again a reminder to all centres that any preferred design studies derived under question 9 must be submitted for approval before the end of September of the academic year that the candidate intends entering.

### **DESIGNING**

#### **Analysis, research and developing a design specification**

Good relevant research and design analysis should consider every possible factor that needs to be considered during the course of designing. Design specifications often have some important criteria but these should be more specific to the individual candidate's product range with clear reference to measurable criteria which would ultimately influence the emerging design solution.

Good specifications impact later on the quality of evaluations which, in many cases tend to be generally descriptive comments. Some candidates continue to produce superficial analysis lacking the depth to inform and affect designing - focussing on the problem at hand enables an understanding of the important factors that will be directly relevant to the design solution.

## **Generating and developing innovative ideas and proposals**

Candidates are demonstrating a range of effective graphic and written communication skills. Design proposals show good levels of creativity and the work of the more talented candidates is supported with appropriate forms of modelling and suggestions for the use of materials and manufacturing processes.

Effective use of sketchbooks continues to improve, enabling candidates to produce informal, creative and innovative thinking early on in their project. Sketchbooks in some centres are used productively, with excellent annotation and are clearly used to move forward candidates' design thinking, applying research data collected and displaying a wide range of communication and graphical techniques.

Clear specifications are used effectively as a design tool throughout idea generation and are also used when candidates evaluate existing products and their own ideas as they develop. Candidates who show evidence of this reflective activity within their design folio score well (also reflecting on the findings of their research and analysis in developing their design ideas).

Candidates should be aware of the value of innovative steps or unique selling points that could be introduced into aspects of their early design ideas. Although product modelling and other forms of quick modelling continue to feature in candidates' work, the need to show evidence of these is vital for moderation purposes. Some good examples of annotated digital images during early modelling were seen only in a few centres.

### **Detail designing**

Final designs in many centres included some basic details such as an exploded drawing and some outline dimensions but parts, materials and component sizes were not included. The marks that were awarded in these cases for Detailed Designing could not therefore be supported. Candidates must aim for sufficient details for the product to be made by a third party without reference back to the designer.

As in DT2 textiles candidates made very effective use of design software to explore pattern and colour possibilities using toiles and patterns to detail their designs. High-level work in textiles demonstrated evidence of pattern development and not merely rely upon commercially produced patterns.

As in previous years, if a candidate is undertaking a design exercise that results in a model, i.e. architectural model, interior design portfolio or a high quality concept model then this must be accompanied by a complete set of client visuals and business plan together with a quality realistic model.

### **Evaluating, reflecting and decision making**

Summative evaluation reports are based on successful critical appraisals of final outcomes, evidence of end testing and sometimes, personal responses to feedback provided through the opinions of others. End testing must therefore continue to be encouraged by teachers using the target audience to test products. Annotated photographic evidence is critical to demonstrate the nature and effectiveness of the end testing.

Again, it is important to note that the assessment criteria used for the higher mark allocation requires the evidence of a range of evaluative techniques.

## **Graphic Communication and key skills**

Many candidates' use of sketchbooks and portfolios is purposeful in reflecting a design pedagogy and are packed with early design ideas, development, product dimensions, material needs, calculations, testing and modelling – all the essential aspects of informal but critical design activity, and communicated effectively. Graphic and written communication skills are excellent in many centres, particularly the detailed engineering drawings where CAD software is exploited to maximise manufacturing detail and visual presentation.

Candidates continue to demonstrate a structured design approach with some excellent communication skills. Good communication often contains clear appropriate presentation of written research and analysis and, as stated good quality sketching in the sketchbook and portfolio.

However, in a small number of centres further work needs to be devoted to the skills associated with producing accurate sketches and clear annotations, which will then demonstrate clarity and depth of understanding.

## **MAKING**

### **Planning for making**

Practical work production in many centres is managed by effective planning strategies and realistic workshop logs which document tasks, progress and alternative ways forward when the need arises.

Candidates who produce good quality forward planning for making and use appropriate quality control and quality assurance features invariably do well in this area. Writing frames and journals indicating the intended work, materials used and processes to be undertaken during particular weeks is done well at many centres.

### **Range and sophistication of making skills**

As in previous years there was a variety of well made products on display within centres, where the candidates used a range of appropriate material combinations which worked effectively.

Candidates work occasionally demonstrates low level making skills with a weak understanding of the materials and equipment required to manufacture their end product. Candidates should be encouraged to experience material properties and characteristics by some form of testing during the development stages.

Innovative characteristics do feature in the production of the final solution where candidates have demonstrated knowledge of the characteristics and working properties of the materials they are using.

### **Accuracy, quality and finish of the design solution**

The sometimes challenging products on display at centres demonstrate mature design, accuracy of construction and good function. It was a pleasure for moderators to see and evidence the care, precision and hard work undertaken by candidates together with the quality of support given by their teachers.

As in DT2, it is essential that candidates who produce architectural models produce them to scale and of a complexity that clearly demonstrate the appearance and layout (external and internal if appropriate) of the proposed building. Very often at the development stage we see that models are progressing well – and then finished by inappropriate methods and poor attention to detail.

## **Functionality and innovation of the design solution**

Candidates willing to take a risk in answering a complex problem and taking on a challenge which is an area rich in thinking skills and who successfully exploit the potential of new technologies, (including 3D printing) do very well. The diverse range of successful finished products reflects the individual interest, enthusiasm and commitment of very talented candidates in a number of centres.

Innovation marks are a reward for the application of new ideas and some of the work seen demonstrated again exciting new innovative end products or innovative steps within the end product.

The value of attending the WJEC Innovation Exhibition and INSET each year is considerable and provides an excellent way for both staff and students to access high quality work and thereby fully appreciate the range and standard which is required at both AS and A level.

**DESIGN AND TECHNOLOGY**  
**General Certificate of Education**  
**Summer 2016**  
**Advanced Subsidiary/Advanced**  
**DT4 - FOOD TECHNOLOGY (A)**

**General Points**

The standard of presentation of coursework was generally high with most candidates presenting work in A3 folders. A few centres have encouraged candidates to present some of their work on A2 sheets for display purposes which is acceptable as long as it is clear where the work fits within the project. All centres are using some sort of sketchbook. The use of sketchbooks does vary quite considerably; in some centres their use seems to be reserved for collecting research, recipes etc, whilst elsewhere they are more extensively used. It is fairly common for there to be little actual sketching within the sketch books of Food Technology candidates. It is essential that candidates put across design ideas effectively in whatever form. It proves very difficult to clearly convey the vision of a final design proposal without including a diagram.

At A2, most candidates are using their time effectively, taking note of the allocation of marks and reducing the quantity of research than that done at AS. It is important at A2 where far fewer marks are available in this section, that concentrated, focussed research is undertaken. With many, a good quality product analysis is at the core of this. Specifications are frequently an area of weakness at A Level as well as at AS. Even though fewer marks are available for the specification, it can be a key to subsequent quality designing, so it is important that it is done to a good standard.

At both AS and A Level, the quality of communication is frequently very good, with a wide range of communication techniques used to good effect. This often includes the effective use of ICT, including nutritional analysis, star diagrams, digital photography etc. Sketching, as already mentioned, is sometimes scarce in some projects. In others, the detailed nature of annotation of diagrams has made them very useful. It is essential that candidates communicate their design ideas effectively, by whatever means they choose.

On-going evaluation tends to be a further strength with many Food candidates. This year again, the thought process of many was very clear and they were explaining their decision-making as they went through the design process. Summative evaluations are often very detailed, frequently including user trials and the views of experts. Occasionally, some Food candidates at A Level could cut back on the amount of material they are producing for their final evaluation. It is important that only evaluative, not descriptive comment is included.

In many centres, design specifications tend to be one of the weaker sections. We are still seeing a number of generic points included on specifications or criteria which are very vague or which do not use measurable criteria when it would have been appropriate. It is fairly uncommon for design specifications to be of a high standard. It is disappointing to see a lack of creativity in some candidates in their design work, particularly at A Level where the marking criteria places much greater emphasis on this factor. It is important that A2 candidates are fully developing their ideas and trying to be as imaginative as they can. With some, design development this year has been rather superficial, amounting to little more

than changing a flavour or adding an extra ingredient. It is important that ideas are properly developed, including, where appropriate, in the methods and techniques to be used. Planning is often very good, with attention paid to quality control issues.

A number of centres are producing practical work of a very good standard with attention to detail and a high quality finish. In many cases, accuracy is high and candidates are using food materials to very good effect. Final products mainly function very well, but many lack innovative features.



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