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Introduction

When students have completed the making of their products, they will need to test how well their product meets the requirements identified in their design specifications.

Careful planning and the setting/monitoring of suitable **deadlines** will be essential to allow sufficient time at the end of their projects to complete this section. Along with Sections 6 (Marketing) and 7 (Review and Reflection) it accounts for 33 marks – over a quarter of the whole marks available.

Students should use and develop skills gained in AS units F521 Advanced Innovation Challenge and F522 Product Study when tackling this section.

**Mark Scheme**

<table>
<thead>
<tr>
<th>5 TESTING and INDEPENDENT EVALUATION of the FINAL PRODUCT</th>
<th>Show evidence of the testing of the final product against the specification. Identify and state strengths and weaknesses in the product. Respond to independent evaluation</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shows evidence of thorough testing of the final product against the specification. Identifies and clearly states the strengths and weaknesses in the product. Responds positively to in depth independent evaluation of the product.</td>
<td>7-9</td>
<td></td>
</tr>
<tr>
<td>Shows reasonable evidence of testing of the final product against the specification. Identifies some strengths and weaknesses in the product Shows a reasonable response to some independent evaluation of the product.</td>
<td>5-6</td>
<td></td>
</tr>
<tr>
<td>Shows limited or no evidence of testing of the final product against the specification. Identifies few strengths and weaknesses in the product. Shows a superficial response to limited independent evaluation of the product.</td>
<td>0-4</td>
<td></td>
</tr>
</tbody>
</table>

There are **three requirements** for candidates’ responses if they are to satisfy the assessment objective (TIS):

1. **Testing to the Specification**
2. **Independent Evaluation**
3. **Strengths and Weaknesses**
Testing against the Specification

**Testing**

**Herb Planting Test**

This was meant for us to find out if herbs of a suitable nature could be planted into the troughs, using excess soil to fill up the space and give more room for the plants to grow. It was easy enough to undertake but was rather messy due to the extra soil being taken out of its bag onto the table.

- Strengths:
  - Easily put the herbs into the pots due to easy removal of troughs.
  - Testing and marked therefore spending.

- Inserting Full Trough Test

This was meant for us to find out if the trough, when full, could be inserted into the frame with no extra effort than without the herbs in. Admittedly, much more care had to be taken when inserting the trough as it had gained more weight and a lot of mess could have been made.

- Strengths:
  - Very stable when in the frame due to weight.
  - Easy to put the trough into frame.

- Weaknesses:
  - Need to rotate slowly otherwise herbs may die.

**Rotating Frame Test**

This was meant for us to find out if the frame could be rotated easily with all the troughs full and the false herbs in, possibly intermixing with two other troughs. During the rotation, the swing of the troughs was not entirely smooth and tall herbs interfered slightly in the process.

- Strengths:
  - Rotates very easily when troughs are full due to lightweight frame.
  - No soil or herbs fell out in the process due to good depth of troughs.

- Weaknesses:
  - Need to rotate slowly otherwise herbs may die.

**Labelling Herbs Test**

This was meant for us to find out if the herbs could be labelled easily removing and inserting the card piece. As long as it was, the card pieces could have been larger and the quantity could be much more.

- Strengths:
  - Easy to insert and remove piece of card due to label holder.

- Weaknesses:
  - Spare card needed if herbs are changed frequently.

**Evaluation against my Specification**

<table>
<thead>
<tr>
<th>Spec. Area</th>
<th>Detailed Reason Why</th>
</tr>
</thead>
<tbody>
<tr>
<td>Function</td>
<td>The herb garden consists of frequent visits within the troughs, which are not possible for different pieces of the frame. There is no immediate action the user can take. The only action to improve would be to use a watered plant when planning the herbs. This would add weight to the product and can be marked as adequate due to the action the user can take.</td>
</tr>
<tr>
<td>Materials</td>
<td>A line drawn across the materials between plants, so its daily use is due to the interaction. The only good can be taken out of this is you can put a watered plant in between plants.</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>Manufacture due to the production and process of marking it. It is a slow process due to the production of the frame. There are more than 20 components to assemble, but changes to the product would be made to enhance the increase.</td>
</tr>
<tr>
<td>Ergonomics</td>
<td>Herbs gives one the need and does not need to make the best out of the worst task. It can be used for a business, it is something that makes one feel comfortable, it weighs less than 50, and can be used by many consumers. The hand-held Aluminium tools, is enough to be held by those more than 5 years.</td>
</tr>
<tr>
<td>Safety</td>
<td>There are a few issues, but safety would not be desirable. There is no safety warning on the frame, nor is it marked with instructions to maintain a good frame.</td>
</tr>
<tr>
<td>Moral Issues</td>
<td>All materials could be used and recycled but have wood, metal and plastic. The product could be manufactured as a different material, or in similar materials, and also look like hand made work are seen for the environment.</td>
</tr>
<tr>
<td>Cost</td>
<td>Product could probably cost more than £2 to manufacture, high-quality materials may not cost more than £55, but the product should have some more than £55.</td>
</tr>
<tr>
<td>Aesthetics</td>
<td>Aluminium makes a nice look and is used for the look and feel, but the metal parts could come in different materials, but makes them with the better parts, the materials are a fine cut and are construct.</td>
</tr>
<tr>
<td>Overall</td>
<td>Everything is fine, but the look and feel is that the product is in the specification, however, these are manufacturing problems. The use of the idea is improved, it is considered.</td>
</tr>
</tbody>
</table>

Students should devise a series of **physical tests** to determine how well their product performs. The finished product needs to be tested in its **intended location**, preferably by its intended user or a suitable consumer to be legitimate.
It should ideally be subjected to all the expected conditions that it would face during the phases of its life - its suitability in all situations and conditions in which it may be placed, used, consumed, stored, packaged, or transported. **Evidence** of this testing must be provided in the form of photographs and/or video clips. A concise account of the testing and the results should be written up with key strengths and weaknesses highlighted/discussed.

**A formal evaluation** against the specification should also be written up. Detailed analysis/justification is required rather than a tick list of spec points. Colour can be used to highlight potential strengths and weaknesses identified.

**Common student misconceptions:**

*No evidence of any actual tests, testing their product in the school workshop, superfluous/inappropriate tests, a lack of detail in the written evaluation.*

**Suggested Activities**

**Peer assessment**

Mark examples of Section 5 from previous years or from examples provided by OCR – focus on a mark out of 3 for each component – Testing/Evaluation, Independent Feedback and Strengths/weaknesses

**Product Analysis**

After watching the iTunes videos on testing (see resources) working individually or in pairs students select an existing product from their chosen material focus. They first identify then describe and justify a range of suitable physical tests that could be carried out on the chosen product. A whole group plenary can be used at the end to assess the suitability of each test.

**Preparation/homework assignment**

Using a similar form to the one shown below, have students plan their own testing by describing and justifying a range of suitable physical tests appropriate to their product.
### Product Design – Homework Assignment

**HAND IN MONDAY**

**Testing – Preparation**

Describe **three** appropriate tests that could be carried out on your product to determine its effectiveness.

For each test describe:

a) A **name** for the test

b) What the test would **involve** (a sketch would be useful)

c) **Why** that particular test would be useful for your product

d) How **well** (you believe) your product would perform

<table>
<thead>
<tr>
<th>Test 1</th>
<th>Test 2</th>
<th>Test 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name:</td>
<td>Name:</td>
<td>Name:</td>
</tr>
<tr>
<td>Show me:</td>
<td>Show me:</td>
<td>Show me:</td>
</tr>
<tr>
<td>Why do it?</td>
<td>Why do it?</td>
<td>Why do it?</td>
</tr>
<tr>
<td>How will it do?</td>
<td>How will it do?</td>
<td>How will it do?</td>
</tr>
</tbody>
</table>
Student Worksheet 1

Evaluating against a specification

Use a range of pre-prepared handouts that include a photo of a suitable product and a simple five-point specification. Working in pair’s student’s practice writing an evaluation against each point then swapping and evaluating each other’s work. (This could be combined with the Product Analysis task above) Make sure the products chosen are available to handle in the classroom/workshop such as hole punches, staplers, binders, G cramp etc…

De Bono’s thinking hats

As a variation on the thinking hats exercise (http://www.debonoforschools.com) use each ‘hat’ to represent an area of the specification such as Function, Ergonomics, Manufacturing, Materials etc. Pupils can work in groups to evaluate a range of products.

Independent Evaluation

Example page
Students should arrange an evaluation of their product by at least two people suitably qualified to give opinion and comment - one of these should be their client. Allowing these people to have direct contact with the product is essential for an effective evaluation. Evidence of this testing must again be provided in the form of photographs and/or video clips and could also include headed/signed letters and audio clips.

A summary of the key findings is preferable to a complete written transcript. This can also allow the student to highlight key strengths and weaknesses. A questionnaire could be used at this stage, not as the sole source of feedback but rather to support and expand upon the range of face-to-face feedback obtained. The emphasis is on the quality of feedback obtained rather than the quantity.

Responding to the independent feedback is crucial for a high mark. It is important that students remain positive and openly consider the suggestions made by others. This may include proposing suitable modifications.

**Common student misconceptions:** Faked feedback, no evidence of contact with a real person, evaluation by email, having only friends evaluate their product, inappropriate questionnaires, written transcripts of entire interviews, no response to the feedback, an assumption that their product is perfect

**Suggested Activities**

**Practice interviews**

Students will need to be confident when conducting their interviews. Working in groups of three (interviewer, interviewee and cameraman/photographer) get them to practice on each other. This does not have be design related; it could be focused on hobbies. There are many styles of interview available on YouTube to help introduce and prepare them.

**Preparation**

Get your students to write 10 appropriate questions that could be used during their interviews. These can be checked in advance by working in small groups.

A handout similar to this one can be used to as a homework assignment during the making to help them prepare for this page:

**Student Worksheet 2**

**Responding positively to feedback**

This skill is best developed throughout the course. AS unit F522 requires a substantial amount of interactive dialogue and peer review throughout and Unit F521 makes use of group feedback before development.

An excellent resource to help students prepare can be found at Smashing Magazine -

**Strengths and Weaknesses**

Example page:

Based upon their testing, evaluation and user feedback students should now be in a position to summarise their products **strengths** and **weaknesses**. If these have been highlighted throughout then this should be easier to achieve. **Quantifying** a range of important strengths/weaknesses is more important than listing every single one. Consideration of **weaknesses** should be in order of seriousness, as this can help students to focus on any improvements required.

Suggested improvements are best presented in the form of **high quality annotated sketches** but could also include CAD models. A selection of **specific** improvements presented and discussed in detail are preferable to a long list of superficial improvements. It should be clear which specific weakness they are addressing. Discussing the **implications** of each weakness should also be encouraged. Note that any improvements needed to make the product more suitable for batch production should be in section 7.
Common student misconceptions: Lists with no explanations, a reluctance to identify weaknesses, superficial improvements, quantity over quality, improvements that do not address the important weaknesses

Suggested Activities

Match up

Using prepared cards get students to match the strength to the description and justification. For example matching “Lightweight” to “due to the use of aluminium tubing” to “this makes it very easy for the user to move it around in the office” helps them to see the structure of a good comment. This could be made more difficult by getting students to work in teams to write them first then break them up and swap over and complete each other strengths/weaknesses.

Next Step

Using edited examples of work from previous years (just the testing and interview pages) get the students to identify the strengths and weaknesses of a variety of products. Then check them against the actual ones.

Sketching improvements practice

This skill should be developed throughout the entire A level course but students can practice by tackling quick re-design tasks as starters or homework assignments. You can vary the level of difficulty by how much is given to them. Ranging from them choosing a product to a prepared sheet with a product and three weaknesses to address listed for them.

Preparation/homework assignment

A sheet similar to the one below can be used to get students thinking about potential improvements during their testing:
**Student Worksheet 3**

**Implications**

Provide students with example products/improvements and ask them to discuss the implications of each change. This can be left open or guided with questions such as “Explain how this will make the production time longer” or “How will this make the product more expensive?”
Preparation/Resources

Familiarisation with the following work can help teachers and students prepare for this section:

**Books**
P80-82 & P140-144 *OCR Design & Technology for A level* by J Grundy, D Hallam, M Hopkinson, S McCarthy

P115-119 *Advanced Design and Technology 3rd edition* by E Norman, J Cubitt

**BSI Education Website** [http://www.bsieducation.org/Education/default.php](http://www.bsieducation.org/Education/default.php)

**iTunes U – Consumer Product Testing**


**iTunes U – Testing Standards**


**Interview Questions**

Previous students’ work / examples from the Centre or from those provided as part of OCR support for this Specification can be analysed/marked and used for guidance.
We'd like to know your view on the resources we produce. By clicking on the 'Like' or 'Dislike' button you can help us to ensure that our resources work for you. When the email template pops up please add additional comments if you wish and then just click 'Send'. Thank you.

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