

Moderators' Report/ Principal Moderator Feedback

Summer 2014

Pearson Edexcel GCSE
in Design and Technology: Electronic
Products (2EP01)

Creative Design and Make Activities (5EP01)

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Introduction

Many positive comments have been sent to Centres' thanking them for the care and attention taken with this year's submission. However this was not always the case. One of the main problems encountered during moderation has been finding evidence to support the mark awarded. When students annotate, finding evidence can be difficult and students can be disadvantaged. Other issues can also make moderating difficult and Centres may find the following check list useful in ensuring that their students are not disadvantaged.

Folders – Please ensure

- They are securely fastened
- Students have their name and number on every sheet
- They are compiled using the stage headings and in the order given in the CMRB
- All pages are numbered

CMRB - Please ensure

- They are securely fastened separately from student's folders
- The front page is completed including showing whether the Student has taken a combined or a separate route with design and make activities
- Page annotation is given for every stage indicating where evidence can be found for each section of work
- The sub-total and total marks are added correctly
- The assessors witness statement has been completed for the electronics and casing
- The declaration form is signed and dated by the teacher and the student
- Good quality photographs are included that show both sides of the PCB as well as the finished product

Further annotation may be provided that helps to support the mark awarded but repeating the descriptors for each stage is not required. Thirty six marks are awarded in total for making and as well as ensuring that the CMRB has photographs, it is recommended that students include a photo-diary in their folders that highlights the range of skills and processes used during the manufacture of the product. Further information is given in the making sections.

Details for each stage are given below. Students would benefit by understanding how each stage feeds into the next and not treating them as separate entities.

Design Activity

Analysing the brief

This section continues to be marked leniently by many Centres due to the fact that students do not analyse their brief. Often, one word spider diagrams are seen and some students specify their project and list the type of process device, output and casing.

Students should be asking questions about their brief in order to identify research and design areas. Many points will be general, for example: what type of battery would be best? How will I access the battery? How will the circuit fasten in the case? In order to access higher marks they should be encouraged to ask questions that are pertinent to their design brief.

For example, for a 'Shed Alarm' the following would be relevant:

How can I detect that someone is trying to enter the shed? Should the product be overt or covert? What would be the most suitable output device? Should the output be timed or require resetting? Is there anything similar on the market? Such points help students to identify their main research and design areas.

Research

The descriptor for the highest scoring box (5 to 6 marks) states "Research is selective and focuses on the design needs identified in the analysis" and this is key to success in this section. It was pleasing to see that more Centres are taking this on board and that students are researching relevant topics. However, there is still a good deal of unfocused research presented that is doing little to help students to write a Specification and subsequently help them when generating design ideas. Unstructured 'research' into materials and components should be avoided as should questionnaires with general questions that do little to progress the students understanding of the design needs.

It should be noted that this section together with Specification, Review and Evaluation should consider issues of sustainability. Please see Topic 6.1 of the subject specification for further details.

Specification

Improvements continue to be seen in this section with most Centres understanding the requirements and as a result marking it more accurate. Most students now justify realistic points and better students include technical and measurable points and some issues of sustainability. All students should attempt to have some measureable points as this allows them to conduct meaningful tests at the end of their project. If a separate make activity is undertaken then the teacher should provide such points.

Initial Ideas

It was good to see more Centres guiding their students to concentrate upon the electronic element of this section. As with all other design and make sections the marks are split approximately two-thirds for electronics and one-third for casings. Casings ideas were generally realistic whilst still demonstrating flair. However, in many cases they could benefit by having more technical information that includes materials and processes. When students are generating electronic ideas they should be demonstrating applied understanding of Unit 2. Circuits that do not have a process device should not be considered and at the other end of the spectrum overly complicated circuits that students do not understand should also be avoided. Students should produce alternative designs that consider variations of input, process and output and annotate their designs to demonstrate understanding of the component parts. More able students should progress to circuits with more than one process device and/or more advanced PIC circuits. Students can gain full marks by using only those components stated in Unit 2.

As with all examinations, Centres should ensure that the work submitted is unique to each student.

Reviews

Some students prefer to integrate this section with their ideas and this is perfectly acceptable as long as it is clearly identified and the points relating to page annotation above are followed. Marking tended to be lenient as this section should also consider user group feedback and issues of sustainability.

Communication

Centre marks were generally accurate and on occasions a little severe as a wide range of techniques were used with precision and accuracy.

Development

Marking tended to be lenient in this section. Both electronics and casings should be developed in the proportions mentioned above. Many Centres concentrated upon one area at the expense of the other. In this section students should be looking to refine and improve upon their initial ideas. Some good traditional and computer simulated modelling was seen but at the top end students would benefit by developing their PCB mask so that it is compact and with as few wire links as possible. Casing development should show how parts or components are fitted and whilst it does not need to be as detailed as the electronics, students should avoid merely producing better quality drawings of a previous casing design.

Final Design

Students should be encouraged to produce this as a separate section although credit was given where evidence could be found during development. Technical details should be given for all the components, materials and processes to be used during the manufacture of the PCB, casing and assembly.

Make Activity

Production Plan

Improvements continue to be seen in this section with the majority of students producing plans that considered all stages of manufacture for the casing and circuit. However due to the lack of specific forms of quality control, marking continues to be slightly lenient. Too often students pose a simple question such as "is it OK" or give quality assurance guidance when a specific test and the equipment needed to conduct the test should be given. Examples include: use a multimeter/continuity tester to ensure tracks have etched successfully; use a ruler/micrometer to check 'x' dimension.

Quality of manufacture

A wide range of work was seen that in the main was accurately assessed. By the nature of our project work students will use a wide range of skills and processes. The key elements in this section are;

- i) the range of skills and processes used
- ii) The level of precision and accuracy
- iii) The level of independence
- iv) The level of challenge

The 'Assessor witness statement' was generally completed well and this helped moderators greatly. Where marking was generous it was usually due to the fact that the task did not present the level of challenge required for high marks. As a general rule the use of one process device such as a transistor or thyristor cannot score in the top box as it does not offer the level of challenge. 555 timers and Op Amps offer slightly more challenge and logic gates more still but it is only when process devices are combined that the challenge is suitable for high marks. Clearly PIC's used with a single input and output would not offer the same level of challenge as one with multiple inputs and/or outputs.

Quality of outcome

It is pleasing to see so many students complete good quality products and the section was generally marked accurately. Quality is the key word in this section. Students should use LED mounts, insulate bare wires, mount their circuit and battery within the casing, feed long wires through stress relief holes and twist loose wires or use ribbon cable. Students should be encouraged to include photographs in their folders that highlight these areas.

Health and safety

Teachers award marks in this section based on their observations of students during the make activity and no formal evidence is required. It was good to see that in most cases photographs of students manufacturing showed them taking precautions to work safely.

Testing and evaluating

Whilst some very good work was seen many Centres do not appear to understand the requirements of this section. Although most students evaluated and included user group feedback there was a lack of actual testing and this should be the main focus of this section. Please note that quality checks during manufacture, modifications and improvement and personal evaluations are not being assessed. Checking the performance of the finished product is the area students should concentrate upon in this section.

Please note that QWC is assessed in this section only and marks cannot be awarded if no work is submitted in this section.

Grade Boundaries

Grade boundaries for this, and all other papers, can be found on the website on this link:

<http://www.edexcel.com/iwantto/Pages/grade-boundaries.aspx>

