

AQA

Year 11 GCSE Design & Technology

Controlled Assessment

Name:

Candidate number:

Centre name: K UXYVf]X[Y'GWcc`

Centre number:

Criterion **1**
Investigating
the
Design Context



In this section you need to;

- decide on a design problem (design brief)
- provide evidence about how you analysed the problem
- do some appropriate research
- determine the type of person you are designing for
- produce a list of criteria for your design ideas

Design brief:

Explain the context or background of your project in a paragraph.

Write up the Design Brief, make sure it fits one of the sample set by the examination board.
You may add in any further detail to the brief - for example, if you chose design task 3 you may define which sporting or musical activity you have decided to focus on.

Analysis:

Produce a spider diagram using the main headings below (the ones in bold uppercase type) - branch off with each question under that heading and then branch off each question with your responses/considerations.

FUNCTION

- What does the product have to do?
- How would it work?
- What should it include or feature?

ENVIRONMENT

- Where is going to be used?
- What environments will it be used in?
- What external factors will affect the product? (eg forces it will be put under, weather, harsh environments etc.)

TARGET AUDIENCE

- Who will it be aimed at? Age - gender - group of people?

MATERIALS

- What properties will the materials need to have?
- What materials may be suitable? - why?

SURFACE FINISH

- What properties would be required from the surface finish of the product?
- What range of surface finishes may be required in different components of the product?

MANUFACTURING

- What methods of production may be suitable for each of the above materials?
- What scale of production should I design for?
- How could I make use of Computer Aided Manufacturing?

AESTHETICS

- What should the product be designed to look like?
- Where or what could I look at to provide inspiration for the visual styling of the product?

SUSTAINABILITY

- How could I minimise the impact on the environment whilst making this product?

SIZE LIMITATIONS

- Are there any limiting factors on size in the place where the product will be used?
- Are there any limiting factors on size in the place where the product will be stored?
- Are there any limiting factors on size due to the equipment and workshop facilities I have available?
- Are there any limiting factors on size relating to the people that will use it?

ERGONOMICS

- How will the product be used/operated by a human?
- What physical interactions will the user have with the product?
- How will the shape of product need to be designed to make it easy to use?
- What range of sizes are the users likely to be? (Age, height, weight etc).

SAFETY

- How can the product be made safe to use?
- What safety features could be included in the product?

TIME

- What timescale do I have for the project?
- How can I manage my time throughout the project effectively?

Try and explain 'WHY' in all of the responses you give to each of the above questions!

Research:

Product Analysis of existing or similar products

Undertake a product analysis of 2 different products. Select products that are similar to the product you want to design. Take or find photographs (from different angles) of the products you have found.

Label all of the product features/parts/components.

Apply the following questions to both products: - do not copy the questions out just provide the answers - could be in a bulleted list or continuous writing that embeds the question in the response (eg Materials that have been used to make this product include...)

- Give a brief description of what the product is and what it's used for
- Who is it aimed at/who would use it (age group/market sector etc.)?
- How is it used?
- How does it work?
- Is it easy/comfortable to use (ergonomics)?
- Comment on the (aesthetic) styling of the product.
- What materials have been used in the product?
- Can you identify how it's been made (manufacturing techniques)?
- Is the product designed with sustainability in mind? eg. Is it made from recycled/sustainable materials, are the materials recyclable, longevity (is it designed to last or is it disposable/have a limited lifespan), is it designed for disassembly at the end of its life cycle to aid recycling?
- How much does it cost?
- Are there parts/resources that need replacing during its lifetime?

Produce a short summary of the product analysis stating clearly how studying the two products may help you with your ideas.

Client/User interview

Conduct an interview with your client or a potential end user of the product you intend to design. Ask the following questions:

- How should the product work/what should it do?
- Where would you use it?
- Who would use it?
- What size should it be?
- What should it look like (shape, colour, styling, etc.)?
- What special features could be included?
- How much would you expect to pay for the product?
- What materials do you think would be suitable?

Record the interview in the most appropriate way - you could simply list the response or alternatively record the interview using audio or video clips.

Research Plan:

Prepare a research plan that outlines the essential information that you will need to help solve your design problem - use the following columns in your table:

Essential information needed	Where I can find it	How will it help me?

NB. Only list things are essential to help you design your product. If you use books/magazines give a full reference. Website URLs should be given where possible as opposed to just suggesting 'the Internet'.

Give a clear explanation of how you think the information you find will help you solve your design problem and make your product.

Focussed research:

To make sure you are fully prepared to start designing your product you need to undertake investigation in the following areas:

- Technical details that are associated with your product
- Measurements of associated products/environments
- Parameters/constraints
- Ergonomics? Anthropometric data collection? (as appropriate)
- Environment where product would be used
- Consideration of aesthetics and functional requirements in relation to cultural diversity
- The work of professional designers - how their work could influence your designs

Analysis of research:

Explain what you have learnt from each piece of focussed research

Summarise the relevance of focussed research and explain how it will be used

When reviewing your research make sure you cut out anything that later seems to be irrelevant or unnecessary.

Design Specification:

Use Specification Writing Framework to produce a clear and detailed list of criteria, that reflects the analysis undertaken.

Number each point in your specification for use in a comparison chart when you evaluate your ideas.

Specification Writing Framework

What is a Specification?

A Specification is a detailed list of requirements that explains what your product should do, be or include.

It should be broken down to state what the product MUST do to be successful, (Essential Criteria) and what you would LIKE it to do to make it more desirable (Desired Criteria).

For example: Two cars both serve the same purpose as a form of transport, but one may have many more desired features, such as; faster engine, alloy wheels and leather seats. They are both still cars though!

KEY CONSIDERATIONS...

These key words cover all aspects of the design of a product. They should be used to help you write more focused specification points.

Some key considerations are often used more than once for different specification points, some will not apply to every project you do, and some specification points might refer to two or more considerations.

When writing specification points try to consider these four aspects:

1. Is it an essential or desired point?
2. Does it relate to a key consideration?
3. Is it as specific as possible?
4. Does it explain the reasons why?

Look at the examples below...

Key Consideration (safety)

The product **must** be safe and have no sharp edges because it is designed for children.

Essential Criteria

Being Specific

Explaining the reasons why



Key Consideration (manufacturing)

The product **could** be made using the laser cutter as it is highly accurate.

Desired Criteria

Being Specific

Explaining the reasons why

Criterion 1
Investigating
the
Design Context

Assess your own work, what mark do you think you have achieved?



- 7 - 8
- Evidence of selecting appropriate relevant research
 - A brainstorm with lots of areas covered and explanations
 - Detailed analysis of relevant existing products
 - Comprehensive analysis of relevant research, explanations of your discoveries & decisions
 - A detailed design specification covering all points raised in the analysis
 - A profile of target user

- 5 - 6
- A brainstorm with lots of areas covered
 - Existing products looked at and evaluated
 - Detailed annotation to accompany all research
 - A design specification covering all points raised in the analysis
 - A paragraph describing the user

- 3 - 4
- A brainstorm with some points covered
 - Some existing products looked at, simple notes made about them
 - Annotation to accompany most research
 - A design specification covering most points in the analysis
 - Some mention of the user of the product

What could you do to improve this section?

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Criterion 2
Development
Of
Design Proposals



In this section you need to;

- produce 6 imaginative designs
- develop 1 idea
- demonstrate evidence of environmental issues and batch production
- research processes and materials
- model the idea
- produce a manufacturing specification
- plan how you will make the product

Ideas:

Read your specification before starting each idea to make sure it fulfils all of the points. Add annotation to your idea to show how your design meets the specification.

Look back over your research to make sure you use the information you have found to help produce your ideas. Add annotation to your idea to show how you used the research in your designs.

Produce at least 6 clear, distinctly different, creative proposals (not just variations on one idea!)

If you are struggling with ideas look more closely at existing or similar products to help inspire you. Styling references can be taken from ANY product - it could be a sports car, building, electronic device, natural forms etc.

Present using sketching - if you sketching is weak use drawing guides and where possible use 3 dimensional drawings (underlays/squared paper etc).

Produce clear, detailed annotation describing all the parts and functions of the product - always explain WHY...

Use modeling to communicate ideas - photograph and draw over if additional detail needs adding.

Selection of idea(s):

Evaluate ideas against specification points (consider using a chart like shown below)

	Idea 1	Idea 2	Idea 3	Idea 4	Idea 5	Idea 6
Spec point 1						
Spec point 2						
Spec point 3						

If the idea you have selected does not cover all the points of the specification make a note of the ones it doesn't fulfil. If you choose to develop this idea you must make sure you modify it to fulfil all points

Discuss your ideas and selection with end user/client, write up this discussion, with your user/clients comments

Detailed written comment must be provided for each idea including:

- What are the good features of the design?**
- What are the weaknesses?**
- How could it be made?**
- Would there be any difficulties in making this product?**
- How could it be improved?**

At the end of your evaluation you should highlight which idea (or combination of ideas) you intend to develop and explain why you chose it.

Additional research:

Now you have chosen your idea to develop you need to consider other areas of research that will help you. E.g. if the idea you have selected is suitable to be made from wood and could be manufactured using CAD/CAM then you will need to research types of wood within your budget and what size of timber fits in the CAM machines - there's no need to research materials that are not being considered within the idea you have chosen to develop.

Again produce a research plan in a second table, detailing what you will research and how it will help you

Development of ideas:

This section is focused on adding more detail to your design idea.

Produce more detailed sketches showing how your idea has developed considering the following;

- Changes to improve the function**
- Changes to improve how the product looks (styling, colour, graphics etc)**
- Sizes of the product or parts (this may also be related to other products that yours has to work with - eg. If you were designing a docking station for an IPOD you would need to make sure your product takes the sizes of the IPOD, speakers and circuit boards into consideration)**
- Constructional details including how parts will fit together and how each component will be made**

Add annotation to explain the changes you have made

Identify any components you intend to use

Produce a model, a small scale prototype of your developed idea

Photograph your model and annotate the decisions made from it

Consider how the ideas you have produced will impact on other things, for example the environment

Eg. Is the product designed with sustainability in mind? eg. Is it made from recycled/sustainable materials, are the materials recyclable, longevity (is it designed to last or is it disposable/have a limited lifespan), is it designed for disassembly at the end of its life cycle to aid recycling?.

Produce detailed drawings of the final solution - CAD models - orthographic drawings etc that include dimensions. (The drawings you produce should show enough detail to enable someone else to make your product).

Your development should be recorded using detailed sketches that are neatly drawn using appropriate techniques...remember to use thick and thin line technique and colour rendering to enhance your drawings and how they communicate.

Planning for making:

Before beginning to make the product you need to consider the order in which you will do things and anticipate the materials/equipment you will need.

Produce a Cutting List showing the materials you will need, with dimensions

Produce a Flow Chart showing stages of production, you must devise a correct order for making the product and suggest stages where quality checks would be necessary

Product/Manufacturing Specification:

Produce a second specification focusing on the production of the product. Use the writing framework to support you.

Your specification should reflect the information you have generated during this section and focus mainly on the following areas;

- Manufacturing techniques (machines/equipment etc.)**
- Construction techniques (ways of joining materials)**
- Materials**
- Finishes**
- Use of CAD software and CAM hardware**
- Use of Jigs and templates for specific parts of manufacturing**
- Time**
- Quality checks**

Criterion 2
Development
 Of **Design Proposals**

SMES stands for; social, moral, environmental and sustainability

26 - 32

- Minimum of 6 imaginative & innovative design ideas, developed with creativity & originality based on ongoing research
- A detailed plan of how you will make the product
- An explanation of how your designs impact on SMES
- Excellent development of idea through wide variety of modeling and testing
- An explanation about how you chose materials
- A detailed product/manufacturing specification

19 - 25

- Minimum of 6 imaginative design ideas, developed with degree of creativity developed to take account of research
- A plan of most parts
- Annotation during development about how designs impact on SMES
- Good development using a variety of techniques
- Description of why you chose materials
- A product/manufacturing specification

12 - 18

- Minimum of 6 design ideas which show some creativity and development
- Some evidence of planning
- Some development influenced by SMES
- Adequate development
- Some mention of why you chose materials
- A product/manufacturing specification

Assess your own work, what mark do you think you have achieved?

32

6 - 11

- Minimum of 6 design ideas that show some variation in approach
- Minimal planning
- Some consideration of impact on SMES
- Development lacks detail, makes some reference to modelling techniques
- A limited product/manufacturing specification of only the most obvious features

What could you do to improve this section?

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Criterion **3**
Making



In this section you need to demonstrate a high level of making, modeling and finishing skills, but also provide evidence of;

- how you selected tools, materials and processes
- quality checks made throughout the product
- how your product can be batch produced

Evidence of selecting tools, materials and technologies:

Photograph yourself selecting tools and explain why you chose those tools

Photograph yourself working with materials and explain why you chose those materials

Photograph yourself operating CAD/CAM equipment and explain why you chose them

Evidence of Quality Control:

Record the Quality Checks you have made throughout practical sessions, produce a table like the one below to fill in throughout the project.

Part	Planned Measurement	Actual Measurement	Pass/Fail	Comment
4 legs	400mm	3 x 400mm 1 x 395mm	Fail	The legs have to be the same size or the table will be wonky, so I will reduce the length of 3 x legs to 395mm

Write a paragraph about how you have achieved accuracy throughout the project. Mention the machines or tools you used to help you.

How can the product be commercially viable?

Write a paragraph about how you could batch produce your product, discuss which machines or processes would enable you to make many identical products.

Photograph jigs and formers you have used to produce your product and annotate to explain the benefits.

Remember you need to do the following during practical lessons to achieve the higher levels;

Work independently

Show a high level of making and finishing skills

Criterion 3
Making

26 - 32

- A final outcome that shows a high level of making & finishing skills and accuracy
- Has selected and used appropriate tools/materials and CAM skillfully and safely
- Worked independently to produce a rigorous and demanding outcome
- QC evident throughout making the project
- The outcome has the potential to be commercially viable and suitable for the target market

19 - 25

- A final outcome that shows a very good level of making & finishing skills
- Selected and used appropriate tools/materials and CAM correctly and safely
- Outcome demonstrates high level of demand
- QC checks applied during making
- The outcome is suitable for the target market and could be commercially viable

12 - 18

- A final outcome that shows a good level of making & finishing skills
- Used appropriate materials, equipment & processes correctly and safely (including CAM)
- Parts of the outcome show high levels of demand
- Did some simple QC
- The outcome needs more development to be suitable for the user

Assess your own work,
what mark do you think
you have achieved?



6 - 11

- A final outcome is largely complete and shows a basic level of making & finishing skills
- Used materials & equipment correctly and safely (including CAM)
- Some parts of the outcome are demanding
- Little evidence of QC
- The outcome has some weaknesses, which means it is not suitable for user

What could you do to improve this section?

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Criterion 4
Testing & Evaluation



In this section you need to;

- show how you have tested throughout the whole of the design and making process
- test the final product
- evaluate the final product

Modifications:

Photograph you making changes to your product as a result of testing throughout the making process. Annotate to explain the test and changes.

Testing:

Test your product by using it. Photograph you testing it and write an account of the experience.

Show the product to your intended user/client and ask them to test it. Present photographs of them using it and write a summary of their response.

Evaluation:

Compare the product against each point of the specification. Again this could be done with a comparison chart like you used when you evaluated your ideas.

Use the Evaluation Writing Framework - make sure you produce it in report format using continuous writing - do not copy questions then answer - embed the question in the start of each paragraph by rewording the question.

Evaluation Writing Framework

What is an Evaluation?

An evaluation is a detailed look at what went well during a project, and how it could be improved if you were to do it again.

Why do we need an Evaluation?

An evaluation is essential to check if a product is successful and suitable for its intended user.

For Example: Imagine buying a chair that no-one had evaluated to check if it was strong enough to hold the weight of a human!

Useful connectives

Adding and also as well as moreover too	Cause & effect because so therefore thus consequently	Emphasising above all in particular especially significantly Indeed	Illustrating for example such as for instance as revealed by in the case of
Sequencing next then first, second... finally meawhile before after	Qualifying however although unless except if as long as apart from	Comparing equally in the same way similarly likewise as with like	Contrasting whereas instead of alternatively otherwise unlike on the other hand

When answering the evaluation questions try to consider the following:

1. Have you been as descriptive as possible?
2. Have you used appropriate connectives?
3. Have you explained the reasons why?

Look at the two examples below of a level 4 and a level 7 response to the question;

'What improvements would make the product better?' ...

Continuous writing; the question included in the sentence

4 I could improve my product by painting it better and using bold text.

Identifying

Identifying

Continuous writing; the question included in the sentence

7 I could make my product better by improving the quality of the painting, in particular the red background which has an uneven finish. Applying two coats of paint and sanding down in-between would produce a smoother finish.

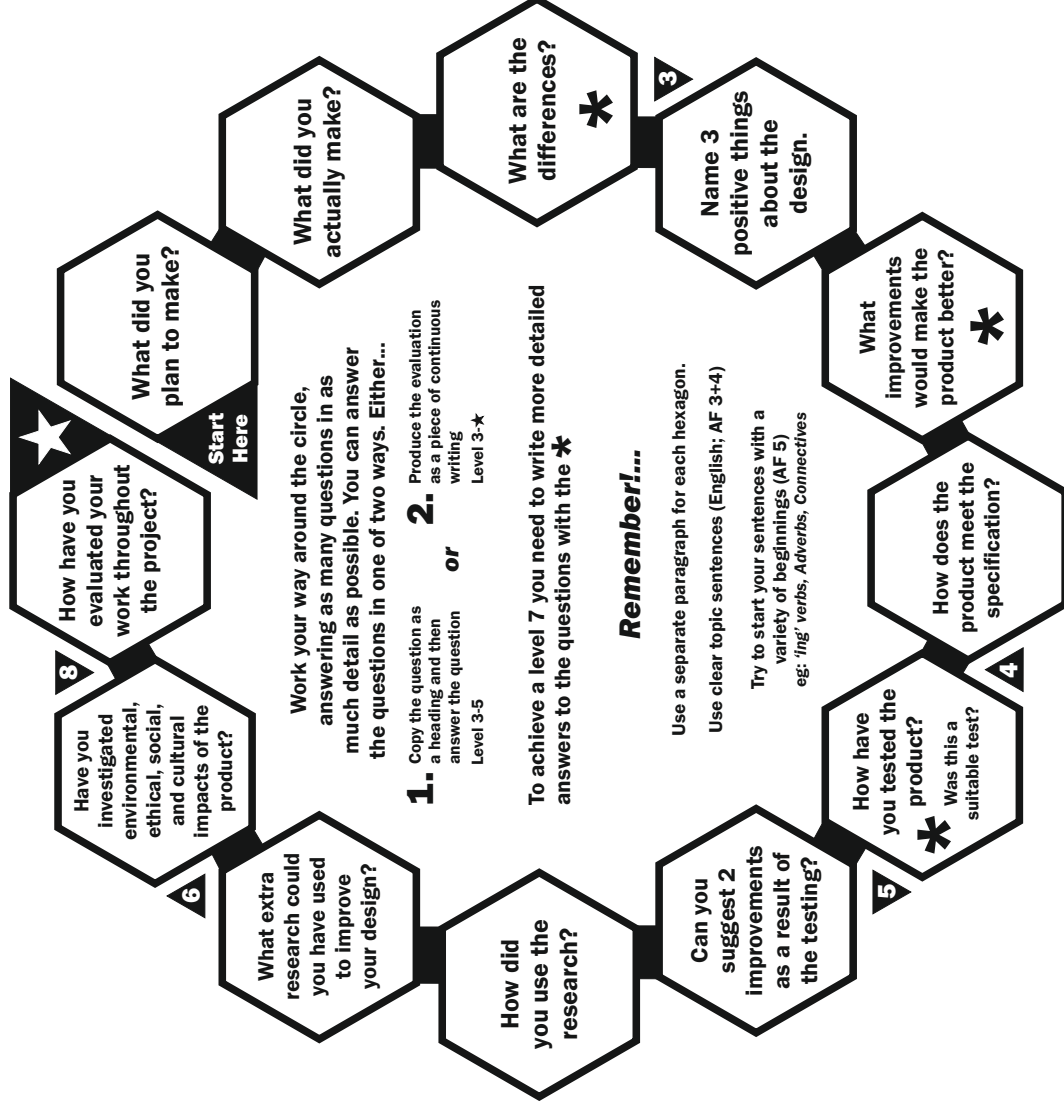
Explaining

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Criterion 4
Testing & Evaluation

Assess your own work, what mark do you think you have achieved?



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|--------|--|
| 9 - 12 | <input type="checkbox"/> Evidence of detailed testing and evaluation throughout |
| | <input type="checkbox"/> Evidence of target users opinion |
| | <input type="checkbox"/> Detailed testing of most of the final outcome against the Specification |
| | <input type="checkbox"/> Evaluate and justify the need for modifications |
| | <input type="checkbox"/> An explanation about how the product needs to be changed for batch production |
| | |
| 6 - 8 | <input type="checkbox"/> Appropriate testing and evaluation throughout |
| | <input type="checkbox"/> Testing of most of the final outcome against the Specification |
| | <input type="checkbox"/> Evaluate the need for modifications |
| | |
| 3 - 5 | <input type="checkbox"/> Some testing and evaluation throughout |
| | <input type="checkbox"/> Some testing against Specification |
| | <input type="checkbox"/> Some improvements suggested |

What could you do to improve this section?

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Criterion 5
Communication



In this section you will be marked on;

- decisions about what to include in your folder
- technical language
- grammar, punctuation and spelling

Folder Content:

Go through the folder and check that you have only included information that is relevant to the project. Remove any work that is; not annotated, repeated or irrelevant.

Language:

Check your annotation makes sense, read through it (ask someone else to read through it) is it clear? Have you used the correct technical language (the right names for tools and processes)

Grammar, punctuation and spelling:

Spell check word processed work.

Check your own work (and ask someone else to check) for grammar, punctuation and spelling mistakes.

- 5 - 6
- Folder is focused, concise & relevant and shows thought about what has been included
 - All decisions communicated in clear and coherent manner with appropriate technical language
 - Text is legible, easily understood, good grasp of grammar, punctuation and spelling

- 3 - 4
- Folder has some good choices about what is included (but has some irrelevant content)
 - Most decisions communicated with some clarity with some technical language
 - Small errors in grammar, punctuation and spelling

Assess your own work, what mark do you think you have achieved?



What could you do to improve this section?

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