

For your GCSE Design & Technology Non Exam Assessment (NEA) students are set a contextual challenge by their exam board. This challenge is a short statement or sentence that provides students with a starting point from which to design.



What is a contextual challenge?

A **contextual challenge** is a short statement or sentence that provides students with a starting point from which to design.

What is a contextual analysis?

Contextual analysis is an exploration of one of the contextual challenges

When will I be given the contextual challenges?

The contextual challenges for the NEA will be set by AQA and allow students to select from a list of three possible challenges. The contexts change every year and are released on 1st June in the year prior to the assessment being submitted.

Contextual analysis is the beginning of your NEA, it is under Section A within the AQA specification.

Section A is the section centred on pupils ability to 'identify, investigate and outline design possibilities'.

Examples of contextual challenges

- A high profile sporting event
- Addressing the needs of the elderly
- Children's learning & play

Contextual challenges can be considered to be a general theme, from which you need to identify a genuine design problem to solve. From this starting point students research design solutions to their problems, identify appropriate users and their needs, create a design brief that will enable them to go on to develop a solution to the original problem.



What is the knowledge I require for a completing a contextual analysis?

Analysis is a detailed examination or exploration of a topic.

Prior to writing your contextual analysis you could do a rough list of your **initial thoughts** linked to the contextual challenge. It is important to note that any idea at this stage must not be disregarded as you must show you have explored a variety of possible ideas to show an in-depth analysis has been conducted. The initial thoughts could be split into different categories or sub categories to ensure your analysis is clear and concise.

Your initial thoughts could then be developed by completing a variety of online **extended research**. Research could include:

- The definitions of key words to clarify their meaning
- Further information on initial ideas
- Design problems or design opportunities linked to your contextual challenge

To **present your research** clearly you could utilise different coloured fonts or text boxes within your contextual analysis to explain your ideas alongside a possible design solutions. E.g. one colour could highlight possible areas for **further investigation** and another colour could indicate a **potential problem to solve**.

AQA Mark Scheme

To achieve the highest marks for Section A the AQA mark scheme specifies that '*Design possibilities must be identified and thoroughly explored, directly linked to a contextual challenge demonstrating excellent understanding of the problems/opportunities.*'



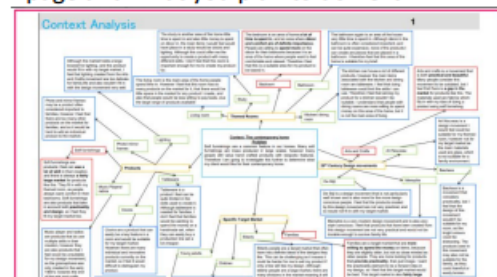
How might I complete a high quality analysis of my chosen contextual challenge?

Your contextual analysis could be presented in the form of a detailed mind map. A mind map is a good method to help you analyse your contextual challenge in more detail and gives you lots of useful avenues to explore.

Remember to be adventurous at this stage, do not disregard any thoughts as it shows the examiner you have explored and considered a variety of design possibilities

Key elements to include in your contextual analysis

- A clear page title, titling the page 'contextual analysis'
- Provide a clear title of the contextual challenge, ensure it is the main focus on the page to highlight its importance
- Include an introduction to the page explaining what you are doing and how it will help you going forward
- Definitions of key words from your contextual challenge
- Categorise your analysis to make your research clearer
- Include a variety of design possibilities & solutions
- Include a summary of what you have learnt from the page and what you plan to do next



For your GCSE Design & Technology Non Exam Assessment (NEA) students are set a contextual challenge, this challenge is a short statement or sentence that provides students with a starting point from which to design. Through research and in-depth investigations pupils must then find a design problem to focus on and create design possibilities for.



What is a design possibility?

Design possibilities are possible ideas or solutions to a genuine problem that has been identified through research & in-depth investigations of the chosen contextual challenge.

What is research?

Research is work that involves studying something and trying to discover facts about it.

What is primary research?

Primary research is one that involves the gathering of fresh data, i.e. when data about a particular subject is collected for the first time, then the research is known as primary one E.g. existing product analysis, client/user interviews/questionnaires/surveys

What is secondary research?

Secondary research is a research method which involves the use of data, already collected through primary research. The main difference between primary and secondary research lies in the fact that whether the research is conducted previously or not e.g. internet research, research from books

Why must I investigate a range of design possibilities?

You must find evidence that a genuine problem exists, one that merits spending time researching, developing ideas and manufacturing a successful product. Initial research is carried out, to prove that the problem is one that should be solved, to improve the lives of others in some way. Initial questionnaire/ survey of potential customers, to ensure that other people view the problem as one worth solving.

Exploring design possibilities is at the beginning of your NEA, it falls under Section A within the specification.

Section A is the section centred on pupils ability to 'Identify, investigate & outline design possibilities'.



What is the knowledge I require for exploring design possibilities?

Begin by investigating the selected context (chosen contextual challenge) to identify design

possibilities/ design problems. Consider these design possibilities in-depth do not fixate on one design idea.

How might I identify a range of design possibilities?

Mind-maps

To show exploration of design possibilities you can write the context in the centre of the page and identify design opportunities. Various design opportunities written around the page. Using two different coloured fonts, one to highlight possible areas for further investigation and the second to indicate a potential problem to solve.

Research

Following on from exploring initial design possibilities, each area must be investigated in further detail using research. This research can be from primary or secondary sources; but a combination of the two is more useful.

Findings

Once you have explored your initial design ideas and investigated them through research you can then start presenting any information found that can back up your research e.g. statistics & quotes. You could also ask potential customers their opinions on the topic & present the results in graphs, pie charts or survey percentages.

AQA Mark Scheme

To achieve the highest marks for Section A the AQA mark scheme specifies that 'Design possibilities are identified and thoroughly explored, directly linked to a contextual challenge demonstrating excellent understanding of the problems/opportunities.' and 'Extensive evidence that investigation of design possibilities has taken place throughout the project with excellent justification and understanding of possibilities identified.'



How might I complete a high quality design possibilities page?

A range of design possibilities must be explored and through research then a suitable and justified design problem must be found. This design problem must then be investigated and solved through the NEA portfolio and referenced to throughout.

Key elements to include within your exploration of design possibilities

- A clear page title, titling the page 'Exploring design possibilities' or 'Design possibilities'
- Exploring a variety of different design possibilities – not fixating on one possibility straight away without exploring a wider range
- Completing a range of research exploring possible design problems/foci
- Quotes from research figures or findings
- Carrying out investigations with potential customers e.g. questionnaires/surveys
- Summarise results from research e.g. pie-charts, graphs
- Ensure investigation work informs design decisions
- Highlighting the chosen focus & justifying your choice
- Summary of findings, decisions & next steps of the design process

Introduction and initial thoughts

These pages were developed as a starting point for a design project. It is intended as a starting point for a design project. It is intended as a starting point for a design project.

These are buildings already built on the site. The school is a primary school. The buildings are made of brick and have red roofs. The school is surrounded by a green lawn. The school is a good example of a school building.

There are many children playing in the school playground. The children are playing on the swings and slides. The playground is a good example of a school playground.

There is a school garden. The garden is a good example of a school garden. The garden is a good example of a school garden.

The diagram shows the layout of the school. The school is a good example of a school layout. The diagram is a good example of a school layout.

These are the ideas of the school. The school is a good example of a school building. The school is a good example of a school building.

These are the ideas of the school. The school is a good example of a school playground. The school is a good example of a school playground.

These are the ideas of the school. The school is a good example of a school garden. The school is a good example of a school garden.

Knowledge Organiser: Design and Technology Research

For your GCSE Design & Technology Non Exam Assessment (NEA) students are expected to complete a variety of research investigations throughout the different stages of the design cycle in order to make informed design decisions. This research provides students with a starting point from which to design and improve on.



What is research?

Research is the task of carrying out a detailed study of a subject in order to discover information or achieve a new understanding of it.

What does reflection mean?

To be reflective is to be conscious of the impact of your findings. Considering what the research means, what is shows, its strengths and limitations.

Types of Research

Primary Research = Research collected in person

Secondary Research = Research collected from secondary sources e.g. the internet & books

What are the advantages of completing research?

- **More fact corroboration:** When you find a fact in one source that is supported in another source, you can be assured that the fact you are using is accurate & backed up with evidence.
- **More viewpoints:** The more resources you use, the more viewpoints you will consider during your topic exploration. This allows you to consider more ideas than the original one you may have thought.
- **Larger frame of understanding:** Because different research sources offer different kinds of information, you can find different ways to understand your topic, depending on the manner in which you need to present your findings.
- **Inspiration:** to utilise your findings to impact design decisions be it through providing a solution to a problem or highlighting a design opportunity
- **Gain knowledge quickly:** with basic research skills you can find the facts about your topic quickly. When you use more research skills and sources, you will be able to gain more facts to use.



What is the knowledge I require for a completing thorough research?

Research is an on-going activity in your NEA to aid design decisions.

Prior to carrying out any research you need to ensure the areas you are analysing are relevant to your chosen contextual challenge and can be utilised within that particular stage of the design process.

Areas of research to consider

- **Contextual challenge research** : researching into the context, different design possibilities & evidence to back up any problems or potential opportunities
- **Designer research** : researching different designers or design movements to look for inspiration for your own product design/s
- **Design inspiration research** : researching different elements to inspire design ideas e.g. colours, shapes, forms, compositions, textures
- **Material Research** : what are the different types of materials, what are the advantages & disadvantages of each, which materials may be suitable for your product
- **Components & Fixing research** : what standard components are available & which may be suitable for your product, researching different ways of fixing elements of your product together
- **Finishes research** : what are the different types of finishes, what are the advantages & disadvantages of each, which finishes may be suitable for your product

AQA Mark Scheme

To achieve the highest marks for Section A the AQA mark scheme specifies that *‘Research should be concise and relate to their contextual challenge. Students are also advised to use a range of research techniques (primary/secondary) in order to draw accurate conclusions.’*



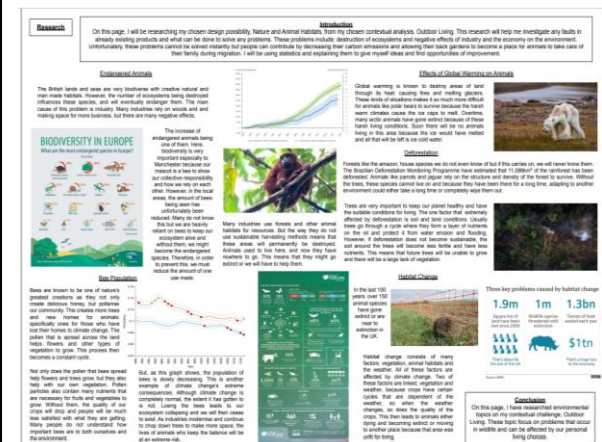
How might I complete a high quality research page?

Your research page could be presented in many ways but should be a combination of visual research alongside clear reflections on how the research backs the points you have highlighted & how it can be used.

Key elements to include in your research pages

- Analyse a variety of different research sources
- Utilise research presented in different ways e.g. written reports, experiment findings, statistics, pie charts, bar charts, graphs, infographics (statistics shown in visual form that portray key concepts)
- Clear reflections needed on all research provided.
- Research needs to be referenced & website links provided for each

Remember to include a summary of your findings, explaining what you have learnt from the process and how it has helped inform your design ideas.



Knowledge Organiser: Design and Technology Product Analysis

For your GCSE Design & Technology Non Exam Assessment (NEA) students are expected to complete a variety of different investigations into design inspirations and existing products. This research provides students with a starting point from which to design and improve on.



What is a product analysis?

A product analysis is the task of analysing existing products to inspire new designs and products.

What does analyse mean?

To analyse something is to examine it methodically and in detail. In a product analysis a chosen product is analysed to provide more in depth information on the design and how it was manufactured.

How can a product analysis be carried out?

- An individual product being analysed.
- Alternatively a number of similar products can be compared with each other using the same criteria.

Product analysis - enables us to understand the important materials, processing, economic and aesthetic decisions which are required before products can be manufactured. An understanding of these decisions can help us in designing/making new products

Primary Research = Research collected in person

Secondary Research = Research collected from secondary sources e.g. the internet & books

What are the advantages of completing a product analysis?

- To look at how a product is made e.g. material components / processes.
- To compare good and bad features.
- To analyse factors that can affect the products performance e.g. size, weight, material.
- To test the functionality of a product.
- To inspire new and improved designs that rival the current existing products on the market.



What is the knowledge I require for a completing a product analysis?

A **product analysis** is a detailed examination or exploration of a product/a collection of products.

Prior to carrying out a product analysis you need to ensure the products you are analysing are relevant to your chosen contextual challenge and a category of products that you are interested in creating/improving.

Areas of analysis to consider

- Aesthetics** – What does the product look like?
- Cost** – How much does the product cost? Would it be considered cheap, affordable or expensive?
- Manufacture** – How has the product been made?
- Ergonomics** – Has the product been ergonomically designed? If so how?
- Materials** – What materials have been used within the product? Are they high or low quality?
- Size** – What is the size of the product? Is it big or small?
- Function** – What does the product do? Does it have multiple functions?
- Target market** - Who is the product targeted at?
- Health & Safety** – Are there any H&S precautions or hazards with the product?
- Environmental** – Does the product impact the environment? Is it environmentally friendly?

AQA Mark Scheme

To achieve the highest marks for Section A the AQA mark scheme specifies that *'students should also use the work of others (past and/or present) to help them form ideas. Research should be concise and relate to their contextual challenge. Students are also advised to use a range of research techniques (primary/secondary) in order to draw accurate conclusions.'*



How might I complete a high quality product analysis?

Your product analysis could be presented in the form of a detailed table. A table is a good method to help you analyse your selected products in a more organised and structured way.

Key elements to include in your product analysis

- Analyse a variety of different quality products in order to compare what's on the market
- Include clear images of the product, multiple views if possible.
- Use a set of clear criteria to analyse each product against for comparison.
- Ensure the analysis is laid out clearly e.g. in a table, in a series of columns, in sectioned text boxes
- Ask your client's opinions on the existing products available to further understand their needs & wants

Remember to include a summary of your findings, explaining what you have learnt from the process and how it has helped inform your design ideas.

Product Analysis						
						
Chair, 1950s Materials: wood, metal Function: seating Cost: £100	Chair, 1950s Materials: wood, metal Function: seating Cost: £100	Chair, 1950s Materials: wood, metal Function: seating Cost: £100	Chair, 1950s Materials: wood, metal Function: seating Cost: £100	Chair, 1950s Materials: wood, metal Function: seating Cost: £100		
Aesthetics	Usability for Consumer	Cost	Environment	Health	Size	
100						
100						
100						
100						
100						
Analysis						

Product Analysis Example

- Clear title included
- Clear images
- Good variety of images
- Analysis of product information
- Comparison table provided

Knowledge Organiser: Design and Technology Identifying a client and user

For your GCSE Design & Technology Non Exam Assessment (NEA) students are set a contextual challenge by the exam board. Pupils must explore a variety of design possibilities and identify a suitable client/user that can aid you within the design process and can be consulted throughout the design development stages.



What is a client?

A **client** is a person or an organisation that wants a product to be designed and manufactured.

What is a user?

A **user** is somebody who would purchase and **use** your product rather than the person or organisation who wants the product to be designed and made.

Can the client and user be the same person?

The client and user can be different people e.g. if you're creating a children's toy your client is more likely going to be the parent whereas the user would be the child. However the client and user could also be the same person e.g. creating sports storage for a P.E teacher, the teacher wants the product to be made and will also use the product.

What is a client/user profile?

A client/user profile is an outline or a brief description of who your client or user is and why they are a suitable choice for your product.

How can I find out my clients needs and wants?

- Questionnaire/Interview with client
- Surveys
- Talking to clients/users
- Internet research

Successful design work always considers the needs and wants of the end user. Focusing on your design problem you need to find out who your end users are and learn what their needs and wants are.

Identifying a client is at the beginning of your NEA, it falls under Section A within the AQA specification. **Section A** is the section centred on pupils ability to *'Identify, investigate and outline design possibilities'*.



What is the knowledge I require for a identifying a client/user?

You must first complete some research to find a suitable client that links with your chosen contextual challenge and the design problem you have identified. You need to find an appropriate client/user that can help you throughout the project.

Client/User-centred design is a style of designing which is where the design of a product is based around the needs of the target market alongside the continual development of iterations. The client/user is questioned and consulted throughout development, and evidence is gathered through questionnaires, interviews, testing and observations, and the results are used to improve the product.

What questions could I ask my client/users?

- What is their age?
- How does your contextual challenge link to them?
- How does your design opportunity or problem affect them?
- What is their opinion on the problem you have identified?
- What is their budget? (economic factor)
- Are they environmentally considerate? (Social factor)
- Do they have any aesthetic preferences? E.g. size, colour, materials, design inspiration.

AQA Mark Scheme

To achieve the highest marks for Section A the AQA mark scheme specifies that 'A user/client must be clearly identified and is entirely relevant in all aspects to the contextual challenge. The student must show that they have undertaken a comprehensive investigation of their client's needs and wants, with a clear explanation and justification of all aspects of these.'



How might I complete a high quality client profile?

Your client profile could be presented in the form of a clear paragraph or bullet points. Your questionnaire should be laid out with clear questions & answers.

Key elements to include in your client/user profile

- A clear page title, titling the page 'Identifying a client/user' or 'Client profile'
- Research possible clients/age ranges to justify your choice of client
- Include a clear client profile – including a brief description of the client and their suitability
- Include a picture of your client to prove they are a real person

Key elements to include in your client/user questionnaire

- A clear page title, titling the page 'Identifying a client' or 'Exploring potential clients'
- Include an introduction to the page explaining what you are doing and how it will help you going forward
- Include a clear questionnaire/survey or interview with your client
- Ask questions about the clients suitability first and then move onto their thoughts on your chosen topic/focus
- Include a summary of what you have learnt from

Target User Profile	Client Interview
 Name: Verity Adams Age: 31 Mother of 2 Verity is a professional and works full-time. When she's not working, Verity enjoys spending time with her family and attending vintage-themed parties. However, due to her busy work schedule, Verity has very little time to make her own costume so usually has to buy them. As she is often invited to these parties, Verity would like to buy a costume that will last a long time so she can re-wear it, as well as it looking really stylish and typical of 1950s style. Money isn't an issue, however quality is important to Verity.	Name: Diane Cross Age: 52 Mother of 2 UK Size: 10/10 What sort of events would you need a 1950s outfit for? A lot of my friends are turning 50 or 60 at the moment and having '50s themed birthday dos, so that mostly, I am also going to the Goodwood Revival this year and need a '50s outfit to wear for that. What properties does your costume need to make it appropriate for these events? Both of these events are quite formal, so the dress would need to be a nice fabric that is quite cool (as September can be hot and petticoats will act as insulation) which is good quality, too, so I can wear the dress to many events in the future without needing to replace anything – and suitable length, sleeves, Goodwood, especially, requires an outfit that doesn't look like a costume and looks really authentic. I also really like circle skirts as they make a dress or skirt unmistakably 1950s. What is your budget for this sort of outfit? It depends on how much I like it, I suppose. To be honest, as long as no more expensive than a real 1950s outfit then I don't mind too much. However, I would really like it to be under £100.

Knowledge Organiser: Design and Technology Design Brief

For your GCSE Design & Technology Non Exam Assessment (NEA) students are expected to write their own design brief which will help determine the final design of the product. The design brief is written as an overview of what the client has requested to be designed and made in order to fulfil their needs.



What is a design brief?

A design brief is a short statement of intent that outlines what you have decided you are going to design and make.

What should a design brief outline?

The brief outlines a problem your design will solve and how it will satisfy the needs and wants of the user. It should be referred to throughout the project to make sure that what you are working on will solve this problem.

What does brief mean?

A brief is a set of instructions or information that is set in preparation of a task. The word 'brief' also means to be quick or to be short in terms of duration, meaning that the design brief should be very clear and to the point.

How does this link to my contextual challenge?

You must draw upon your contextual challenge and initial research in order to formulate your design brief. Your design brief must show a clear journey from initial ideas to developed product ideas.

The design brief falls under Section B within the AQA specification. **Section B** is the section centred on pupils ability to '*Identify, investigate and outline design possibilities*'.

Based on conclusions from their investigations students outline design possibilities by producing a design brief and design specification. Students should review both throughout the project.



What is the knowledge I require for a completing a design brief?

A design brief is a simple summary of what you intend to make and why.

Prior to writing out a design brief you must have carried out a questionnaire/interview with your client as it will provide valuable criteria for you to base your design idea around.

What does the success criteria look like in an example brief?

Sentence 1 – What are you going to design and make?
e.g. I am going to design and make a storage unit...

Sentence 2 – Now add more detail. Who is the product for? e.g. the storage unit is for an architect who works in a typical office/studio.

Sentence 3 – What extra details has your client / customer asked you to apply to the product you are going to design?

e.g. the storage unit will have a hinged or sliding lid, so that access is easy. However, it will also be secure as it will have a built in lock. e.g. It will be designed to hold a selection of items including...

Sentence 4 – Other information?

e.g. The storage unit will be attractive and interesting to look at. It will be lightweight so that it can be moved and installed in another room / environment

AQA Mark Scheme

To achieve the highest marks for Section B the AQA mark scheme specifies that 'students must provide a Comprehensive design brief which clearly justifies how they have considered their user/client's needs and wants and links directly to the context selected.'



How might I complete a high quality design brief?

Your design brief needs to be a short & simple paragraph of what you are doing for your project. It should be clear and concise.

Key elements to include in your design brief

- Clear title
- Clear & concise summary of design intentions and a simple explanation as to it's relevance
- Link product to client/target market
- Try to keep your design brief within 4-5 sentences to ensure it is to the point
- Do not over complicate or over explain your design/project
- Write the design brief alongside the design specification as they both inform and inspire one another

Design Brief Example 1

To design and create lighting for the school's boarding house to be used by students living in the boarding house. It can be for a bedside table, personal study desk, communal ambient lighting or for outdoor lighting. It is important that the product does its specific purpose for the lighting option chosen such as enough lighting for reading if a bedside light and it is able to be disassembled to a smaller size for cheaper and easier packaging. Also the design needs to be viable for possible industrial and batch production using industrial techniques/processes.

Design Brief Example 2

By completing some initial investigation work I am going to develop a children's interactive toy which would help in the physical or intellectual development, specifically focussing on children aged 0-3. I have already looked at products that are on the market and have established there are some common features that must be included, you will find these in the design specification. The prototype I design should be educational as well as being fun and exciting for the child.

Knowledge Organiser: Design and Technology Design Specification

For your GCSE Design & Technology Non Exam Assessment (NEA) students are expected to write their own design specification which will help determine the final design of the product. The design specification is used as a checklist throughout and at the end of the project to see what has and hasn't been achieved and what may have been adapted.



What is a design specification?

A **design specification** is a selection or a list of design requirements that your intended product must have, do or be.

In your design specification you must write about a series of set criteria to work alongside. The specification will act as a guide and ensure you have a sense of direction when you come to create your design ideas and models.

Specification are used as a checklist throughout and at the end to see what has and hasn't been achieved.

What does specify mean?

- To specify means to state a fact or requirement clearly and precisely
- Identify clearly and definitely

What does a design specification include?

The specification draws on the information collected and presented during the research section. The specification is a number of straightforward statements, made clearly outlining the nature of the project to be designed and manufactured. If the research section has not been completed fully, the specification will also be lacking.

The design brief falls under Section B within the AQA specification. **Section B** is the section centred on pupils ability to '*Identify, investigate and outline design possibilities*'.

Based on conclusions from their investigations students will outline design possibilities by producing a design specification. Students should review the specification throughout the project.



What is the knowledge I require for a completing a design specification?

A **design specification** is usually a list of points, with each point detailing how you intend the design to be or what it is for.

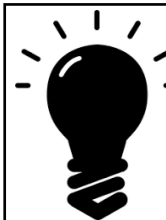
Prior to carrying out a design specification you must have completed a thorough investigation into your chosen contextual challenge. Research should include a contextual analysis, design possibilities, client research/questionnaires and product analysis. This research will allow you to create a clear and concise design specification that should help determine the final design of the product.

Examples of design specification points

1. The material I will use will be plywood as it is more affordable than natural timbers, it is lightweight and can be easily laser-cut/engraved.
2. The overall shape will depend on the ergonomics of the hand. I will base the dimensions on statistics worked out as part of my research.
3. I intend to use a colour scheme based on red and blue because the questionnaire I carried out shows these are the most popular colours.
4. The product will have the following functions: (List exactly what the product will do). E.g. the solution will stand on a desk / fixed on a wall.
5. The product is aimed at the 12-15 age group as my research suggests this would be the most successful market.

AQA Mark Scheme

To achieve the highest marks for Section B the AQA mark scheme specifies that 'students must provide a comprehensive design specification with very high level of justification linking to the needs and wants of the client/user. Fully informs subsequent design stages.'



How might I complete a high quality design specification?

Your design specification could be laid out in a table to set out each specification point clearly, you could also consider a structured list/paragraphs.

Key elements to include in your design specification

- The specification should be composed of simple, clear statements. Keep the statements as short as possible.
- Refer to the research you have carried out e.g. "The colour scheme will be based on blue & red as these colours are the most popular - as seen in my questionnaire".
- Keep the number of statements to between 7 to 8 in total. Specifications should be short and precise.
- Each of the statements should help determine the final design of the product. For example, there may be a statement concerning the overall size or weight of the product. This clearly limits the design of the product.

Points to consider including on your design specification

Design Specifications

AESTHETICS: My product must follow a design strategy from one of my researched design influences. Also it must appeal to the clients preferences who enjoys the use of wood and likes colours related to House. Packaging does not need lots of special design/features so can be simple.

COST: The light must be priced between \$25 - \$30 or \$50 - \$60 depending if it's a task or ambient lamp because this is what the client will be willing to pay. From analysis of existing products, it showed that their prices were similar at \$24 for a moderate ambient lamp. Also the lamps price should display the design and quality.

CUSTOMER: The heads of Boarding House will be the clients who are buying the product but Boarding students will be the end users. From request of the client, the product must be durable, robust and safe from any possible hazards.

ENVIRONMENT: These products will be placed in the Boarding House in either the user's room or the shared common room. Both myself and the client want the lamp to be as environmentally friendly as possible. This can be done by using an energy efficient bulb or LED as well as using simple Eco-friendly material for the packaging.

SIZE: The Boarding House rooms don't have much space therefore the space on desks and tables are minimal, 40-45cm and 50x100cm. The lamp will have to have a small footprint as a bedside or study light as the tables are also used for other functions. If it is going to be used as an ambient light in the communal area, there is more freedom in its size as there is more space.

SAFETY: The product must not have open bulb or wires so that there is no possibility of the user harming themselves by electrocution or burn. Making the light durable so that it doesn't break easily and cause harmful pieces to be broken off is an feature requested by the client.

FUNCTION: The product could be either a task (bedside and study) or ambient (communal areas) light. For a task light, the client required it to be able to direct its light for only one person. It could also have the possibility of several functions to make up for the space it's using. For an ambient light, it should have a soft and warm glow to not disturb anyone in the area and create a nice atmosphere.

MATERIALS/MANUFACTURING: The product will be batch produced meaning it must be able to be made using industrial processes. This means using different materials such as a 3D printer. The client preferred the use of wood as a material but also likes steel or iron. These materials should be long lasting and the wood could possibly be locally sourced.

- Aesthetics
- Environmental Impacts
- Function
- Health and Safety
- Ergonomics
- Size
- Cost
- Materials
- Client
- Manufacture
- Quality Control
- Social/moral concerns
- Quality assurance

Knowledge Organiser: Design and Technology Model Development

For your GCSE Design & Technology Non Exam Assessment (NEA) students are expected to complete a variety of product models based off the variety of design ideas produced during the project. Models can vary in quality but must show development & highlight any improvements/modifications that need to be made according to the client & specification.



What is a model?

A model is a three-dimensional representation of a design idea, typically on a smaller scale than the original. Models are used for visuals, testing and development.

What can a model be made of?

Models are usually made of inexpensive materials such as cardboard, paper, clay, foam etc. Models are produced quickly and cheaply to create three-dimensional mock-ups of a design/s prior to full scale production or prototyping.

What is model development?

Model development is an iterative process, in which many models are created, tested and improved upon until the model fits the desired criteria as stated by the client and design specification.

What are the advantages of creating a model?

- Identifying issues before production which saves time & cost
- Quicker speed of manufacture.
- Potential target market can look at a model & give feedback.
- To further develop and adapt designs
- Prototypes can be tested on how well it functions/fits/feels
- To run through the assembly process & plan production

The model development section is half way through your NEA, it falls under Section D within the AQA specification. **Section D** is the section centred on pupils ability to 'Developing design ideas.'. Pupils need to provide excellent modelling, using a wide variety of methods to test their design ideas, fully meeting all requirements.



What is the knowledge I require for a completing a series of successful models?

Creating a physical model allows a designer to see and handle a product unlike viewing it on a sketch or on a screen through a CAD drawing.

Modelling

Modelling ideas in card, paper, cardboard or other materials can create a cheap and quick way to do initial trials with a product. Using an easy to modify material provides a good way of seeing how a product looks and works, e.g. checking handles are in the right place or parts fit together well. Taking photographs throughout this can show development.

Testing

Models can be tested in a variety of ways:

- destructive testing - tests the product to its extreme to see what conditions it can tolerate before being destroyed, to help decide on the best materials and construction methods to use
- non-destructive testing - tests the model to identify areas of weakness without destroying it, to test the function of the product and highlight any unexpected design flaws
- market testing - tests the product with its target market to give feedback on performance and design

AQA Mark Scheme

To achieve the highest marks for Section C the AQA mark scheme specifies that 'Students will develop and refine design ideas. This may include, formal and informal 2D/3D drawing including CAD, systems and schematic diagrams, models and schedules. Students will develop at least one model, however marks will be awarded for the suitability of the model(s) and not the quantity produced.'



How might I complete a high quality model?

Models can be produced using a wide range of 2D/3D techniques (including CAD & CAM where appropriate) in order to develop a successful design mock-up.

Key elements to consider when creating a model

Cardboard Models

Designers can use easy-to-form and easily accessible materials, e.g. cardboard, to create cheap models quickly and cheaply. These materials can then be joined together quickly and easily using similarly cheap adhesives such as masking tape, hot glue guns, PVA glue or by simply creating inserts for sections to be slotted together.



CAM Models

Computer aided manufacture (CAM) models can be made by using a variety of different CAM machinery e.g. 3D printers, laser cutters or CNC routers. Laser-cutters can cut out 2D sections that can be layered up or slotted together to form a three-dimensional object. 3D printer using a CAD drawing can produce very accurate models but it is expensive, time-consuming and limited to 3D-printable materials.

