



The final first teach date for **A Level Design and Technology: Fashion and Textiles (H405)** is **September 2026**. The final assessment opportunity for the H405 qualification will be **Summer 2028**. There is no resit opportunity.

Specification

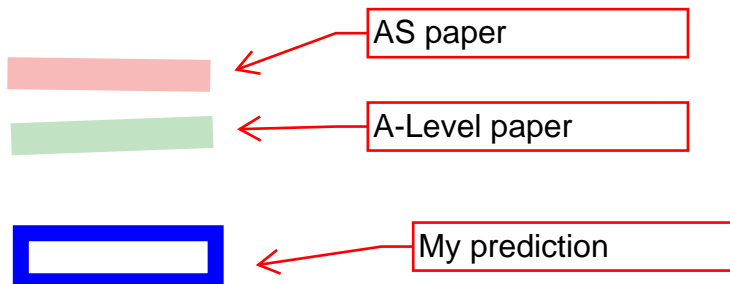
A Level

# Design and Technology

Cambridge OCR Level 3 Advanced GCE  
in Design and Technology

H404–H406

This should not be used as a substitution for thorough revision. Just my best guess at what I think might come up along with the bog standard questions. E.g. Maths, Materials, etc etc



## 2g. Product Design (H406/01 and H406/02)

The content of this component is focused towards products and applications and their analysis in respect of:

- materials, components and their selection and uses in products/systems
- industrial and commercial practices
- wider issues affecting design decisions.

It is essential that materials and components are studied from the perspective of analysing modern consumer products that are designed to meet identified consumer needs, their design and manufacture, and taught within the context of product development and industrial and commercial practices.

Learners should be familiar with a range of materials and components used in the manufacture of commonly available products, and they should be able to make critical comparisons between them.

The aim of the component is to give learners a framework for analysing existing products that enables them to make considered selections of appropriate materials and manufacturing processes when designing.

The component brings together the knowledge, understanding and skills acquired in the NEA.

2

### 1. Identifying requirements

*Considerations*

*Maths & Science*

#### 1.1 What can be learnt by exploring contexts that design solutions are intended for?

- a. Understand that all design practice is context dependent and that investigations are required to identify what makes a context distinct in relation to:
- environment and surroundings
  - user requirements
  - economic and market considerations
  - product opportunities.

#### 1.2 What can be learnt by undertaking stakeholder analysis?

- a. Demonstrate an understanding of methods used for investigating stakeholder requirements, such as:
- user-centred design and stakeholder analysis
  - SWOT analysis
  - focus groups
  - qualitative observations
  - market research to identify gaps for new products or opportunities to update existing products
  - use of forecasting companies to identify technological and fashion trends.
- b. Demonstrate an understanding of how enterprise can help drive the development of new product ideas through routes to innovation such as:
- entrepreneurship
  - commercial partnerships
  - venture capitalists and crowd funding websites.



DESIGNING PRINCIPLES

<i>Considerations</i>		<i>Maths &amp; Science</i>
<b>TECHNICAL PRINCIPLES</b>	<b>1.3 How can usability be considered when designing prototypes?</b>	
	<p>a. Learners should be able to analyse and evaluate factors that may need consideration in relation to the user interaction of a design solution, including:</p> <ul style="list-style-type: none"> <li>i. the impact of a solution on a user's lifestyle</li> <li>ii. the ease of use and inclusivity of products</li> <li>iii. ergonomic considerations and anthropometric data to support ease of use</li> <li>iv. aesthetic considerations.</li> </ul>	
	<p>b. Demonstrate an understanding of the ergonomic factors that may need considering when developing products, including:</p> <ul style="list-style-type: none"> <li>i. anthropometric data to help define design parameters associated with the human body</li> <li>ii. user comfort, layout of controls, software user interface.</li> </ul>	

<b>2. Learning from existing products and practice</b>		<i>Maths &amp; Science</i>
<i>Considerations</i>		
<b>DESIGNING PRINCIPLES</b>	<b>2.1 Why is it important to analyse and evaluate products as part of the design and manufacturing process?</b>	
	<p>a. Analyse and evaluate the features and methods used in existing products and design solutions, to inform opportunities and constraints that may influence design decisions to offer product enhancement, including:</p> <ul style="list-style-type: none"> <li>i. the context of the existing product and the context of future design decisions</li> <li>ii. the multiple materials and components used</li> <li>iii. methods of construction and manufacture</li> <li>iv. how functionality is achieved</li> <li>v. the ease of use, including: ergonomic and anthropometric considerations</li> <li>vi. inclusivity of products and appropriate considerations of application to a wide variety of users</li> <li>vii. fitness for purpose</li> <li>viii. the impact on user lifestyles</li> <li>ix. the effect of trends, taste and/or style</li> <li>x. the effect of marketing and branding</li> <li>xi. the considerations of how to get a product to market.</li> </ul>	
	<b>2.2 Why is it important to understand technological developments in product design?</b>	
	<p>a. Be able to critically evaluate how new and emerging technologies influence and inform the evolution and innovation of products in both contemporary and potential future scenarios.</p>	

Considerations

Maths & Science

**2.3 Why is it important to understand both past and present developments in product design?**

- a. Recognise how **past and present** product designers, **technologies** and design thinking have influenced the style and function of products from different perspectives, including:
- i. the impact on industry and enterprise
  - ii. the impact on people in relation to: lifestyle, culture and society
  - iii. the impact on the environment
  - iv. consideration of sustainability.

- a. Understand how **key historical movements and figures** and their methods have had an influence on future developments in product design.

**2.4 What can be learnt by examining lifecycles of products?**

- a. Demonstrate an understanding of a **product's marketing lifecycle** from initial launch to decline in popularity, including:
- i. consideration of initial demand, growth in popularity and decline over time
  - ii. methods used to create more demand and maintain a longer product popularity
  - iii. new models of marketing and the influence of social media.

**3. Implications of wider issues**

Considerations

Maths & Science

**3.1 What factors need to be considered whilst investigating design possibilities?**

- a. Understand how social, ethical and **environmental issues** have influenced and been impacted by past and present developments in design practice and thinking, including:
- i. **consideration of lifecycle assessment (LCA)** at all stages of a product's life from raw material to disposal
  - ii. the source and origin of materials; and the ecological and social footprint of materials
  - iii. **the depletion and effects of using natural sources of energy and raw materials**
  - iv. **planned obsolescence**
  - v. **buying trends**
  - vi. environmental incentives and directives.



**3.2 What factors need to be considered when developing design solutions for manufacture?**

- a. Awareness of the responsibilities and principles of **designing for manufacture (DFM)**, including:
- i. planning for accuracy and efficiency through testing and prototyping
  - ii. being aware of issues in relation to different scales of production
  - iii. designing for repair and maintenance
  - iv. **designing with consideration of product life.**



Considerations

Maths & Science

- b. Awareness of product lifecycles that extend useful product life through planning for and consideration of maintenance, repair, upgrades, remanufacture and recycling systems.
- c. Demonstrate an understanding of how environmental factors impact on:
  - i. sourcing and processing raw materials into a workable form
  - ii. the disposal of waste, surplus materials and components, by-products of production including pollution related to energy
  - iii. cost implications related to materials and process.
- d. Demonstrate an understanding of sustainability issues relating to industrial manufacture, including:
  - i. fair trade and the Ethical Trade Initiative (ETI)
  - ii. economic issues and globalisation
  - iii. material sustainability and optimisation, availability, recycling and conservation schemes, such as:
    - o exploring the impact and use of eco-materials
    - o exploring how materials can be up-cycled.

**3.3 What factors need to be considered when manufacturing products?**

- a. Demonstrate an understanding of how to achieve an optimum use of materials and components, including:
  - i. the cost of materials and/or components
  - ii. stock sizes and forms available
  - iii. sustainable production.



**3.4 What factors need to be considered when distributing products to markets?**

- a. Understand the issues related to the effective and responsible distribution of products, including:
  - i. cost effective distribution
  - ii. environmental issues and energy requirements
  - iii. social media and mobile technology
  - iv. global production and delivery.



- b. Demonstrate an understanding of the implications of intellectual property (IP), registered designs, registered trademarks, copyright, design rights and patents, in relation to ethics in design practice and consumer rights.

**3.5 How can skills and knowledge from other subject areas, including mathematics and science, inform decisions in product design?**

- a. Demonstrate an understanding of the need to incorporate knowledge from other experts and subjects to inform design and manufacturing decisions, including the areas of science and mathematics.



- b. Understand how undertaking primary and secondary research and being able to interpret technical data and information from specialist websites and publications supports design development.



TECHNICAL PRINCIPLES

## 4. Design thinking and communication

Considerations

Maths &  
Science

### 4.1 How do product designers use annotated 2D and 3D sketching and digital tools to graphically communicate ideas?

- a. Demonstrate an understanding of how to use annotated sketching and **digital tools** to graphically communicate ideas and sketch modelling to explore possible improvements, in terms of physical requirements, such as:
- function, usability, construction, movement, stability, composition, strength
  - aesthetic qualities
  - manufacturing processes
  - suitability of materials and components.

- b. Demonstrate an understanding of methods used to communicate the construction of design solutions to inform third parties, such as producing:
- working/technical drawings
  - digital visualisation
  - schematic diagrams and lay plans if appropriate
  - flowcharts with associated symbols
  - prototypes and models.



### 4.2 How do industry professionals use digital design tools to support and communicate the exploration, innovation and development of design ideas?

- a. Demonstrate an understanding of how designers develop products using digital tools and online collaboration, such as:
- discussing and exchanging ideas with specialists
  - developing designs concurrently with other designers
  - explaining and communicating their design decisions to stakeholders.

- b. Demonstrate an understanding of how **digital design software** is used during design development, such as:
- visual presentation, rendering and photo-quality imaging
  - product simulation
  - scientific analysis of real-world physical factors to determine whether a product will break or work the way it was intended.

### 4.3 How do product designers use different approaches to design thinking to support the development of design ideas?

- a. Awareness of different strategies, techniques and approaches to explore, create and evaluate design ideas, including:
- **iterative designing**
  - user-centred design
  - circular economy
  - systems thinking.

- b. The importance of collaboration to gain specialist knowledge from across subject areas when delivering solutions in the design and manufacturing industries.

- c. Understand how design teams use different approaches to project management when faced with large projects, such as critical path analysis, scrum and six sigma.

TECHNICAL PRINCIPLES

DESIGNING & MAKING PRINCIPLES

2



## 5. Material and component considerations

Considerations

Maths &  
Science

### 5.1 What factors influence the selection of materials that are used in products?

- a. Understand that the selection of materials and components is influenced by a range of factors, including:
- functional performance
  - aesthetics
  - cost and availability
  - properties and characteristics
  - environmental considerations
  - social, cultural and ethical factors.



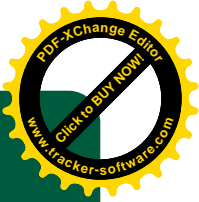
### 5.2 What materials should be selected when designing and manufacturing products and prototypes in product design?

- a. Understand that most products consist of multiple materials and that product designers are required to discriminate between them appropriately for their use, including:
- hardwoods and softwoods, such as:
    - oak, teak and beech; pine, spruce and fir
  - manufactured boards, such as:
    - plywood, MDF and block board
  - ferrous and non-ferrous metals, such as:
    - cast iron, mild steel and stainless steel; aluminum and copper
  - metal alloys, such as:
    - brass, bronze and tungsten
  - thermopolymers and thermosetting polymers, such as:
    - PET, HDPE, PVC, LDPE, polypropylene, polystyrene and ABS; urea formaldehyde, epoxy resin and polyester resin.
  - natural and synthetic fibres, such as:
    - cotton, wool and silk; polyester and nylon
  - textile fabrics, such as:
    - woven, non-woven, knitted and blended textiles
  - composite materials, such as:
    - fibre-reinforced plastics, glass-reinforced plastics (GRP) and carbon fibre (CFRP)
  - modern materials, such as:
    - e-textiles, super-alloys, graphene, bioplastics and nanomaterials
  - smart materials, such as:
    - thermochromic, photochromic and electrochromic materials; shape memory alloy and shape memory polymers; conductive paints and e-textiles.





TECHNICAL PRINCIPLES

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**5.3 Why is it important to consider the properties/characteristics of materials when designing and manufacturing products?**

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|--|---|
| <p>a. Understand why the characteristics and properties of the materials in 5.2a make them suitable for use in a variety of products dependent on the contextual application, including:</p> <ul style="list-style-type: none"> <li>• density, strength, hardness, durability, strength-to-weight ratio, stiffness, elasticity, impact resistance, plasticity, malleability and ductility, corrosive resistance to chemicals and weather, flammability, absorbency, washability, thermal and electrical conductivity, resistance to decay, biodegradable.</li> </ul> |  |
| <p>b. Understand how the available forms, costs and properties of materials contribute to the decisions about suitability of materials when developing and manufacturing their own products.</p>   |  |

TECHNICAL PRINCIPLES

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## 6. Technical understanding

Considerations



Maths & Science

TECHNICAL PRINCIPLES



### 6.1 What considerations need to be made about the structural integrity of a design solution?

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| a. | Learners should understand how and why some materials and/or system components need to be reinforced or stiffened to withstand forces and stresses to fulfil the structural integrity of products.        |  |
| b. | Learners should understand processes that can be used to ensure the structural integrity of a product, such as: <ul style="list-style-type: none"> <li>• triangulation</li> <li>• reinforcing.</li> </ul> |  |

### 6.2 How can products be designed to function effectively within their surroundings?

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|----|---|---|
| a. | Understand how surface finishes and coatings can be used to enhance the appearance of products and the methods of preparing different surfaces to accept finishes in order to deliver a decorative, colourful and quality outcome.  |    |
| b. | Understand how materials and products can be finished in different ways to prevent corrosion or decay in the environment they are intended for, such as: <ul style="list-style-type: none"> <li>• paints, varnishes, sealants, preservatives, anodising, plating, coating, galvanisation and electroplating.</li> </ul> |  |

### 6.3 What opportunities are there through using smart and modern technologies within products?

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| a. | Demonstrate an understanding of how smart materials change the functionality of products, such as: <ul style="list-style-type: none"> <li>• colour changes, shape-shifting, motion control, self-cleaning and self-healing</li> <li>• smart materials used in medical procedures to act in a way that conventional materials and processes would not previously have permitted.</li> </ul> |  |
| b. | Understand how modern technologies can support the function of products, such as: <ul style="list-style-type: none"> <li>• programmable components that can be built into a product and coded to respond to inputs that command an action.</li> </ul>  |  |

## 7. Manufacturing processes and techniques

Considerations





Maths &  
Science

DESIGNING & MAKING  
PRINCIPLES

### 7.1 How can materials and processes be used to make iterative models?

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| a. | Understand that 3D iterative models can be made from a range of materials and components to create block models and working prototypes to communicate and test ideas, moving parts and structural integrity.                     |  |
| b. | Demonstrate an understanding of simple processes that can be used to model ideas using hand tools and digital tools such as rapid prototyping, or digital simulation packages to support the creation of iterative developments. |  |

### 7.2 How can materials and processes be used to make final prototypes?

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| a. | Understand methods of joining similar and dissimilar materials within products to fulfill the following functions: <ol style="list-style-type: none"> <li>permanently joining materials to include constructional joints</li> <li>temporarily/semi-permanently joining materials</li> <li>adhesion and heat</li> <li>using standard components and fixings.</li> </ol>   |    |
| b. | Demonstrate an understanding of a variety of processes, tools and machinery used to accurately manufacture final prototypes in the workshop made from wood, metal and polymers, including: <ol style="list-style-type: none"> <li>wasting techniques, such as drilling, sawing, shaping and abrading</li> <li>moulding methods, such as thermoforming and vacuum forming</li> <li>milling metals and turning woods</li> <li>casting of metals such as lost wax casting, sand casting, low temperature and resin casting</li> <li>forming and lamination</li> <li>bending, rolling and forming sheet material.</li> </ol> |  |
| c. | Understand how digital technology, including the use of computer-aided design (CAD) and computer-aided manufacture (CAM) can be used in the making of final prototypes.  |   |
| d. | Understand how the design of templates, jigs, formers and moulds ensure quality and accuracy when making a final prototype.  |  |
| e. | Understand how the available forms, costs and working properties of materials contribute to the decisions about suitability of materials when developing and manufacturing products.   |  |

TECHNICAL PRINCIPLES

2



Considerations

Maths & Science

7.3 How can materials and processes be used to make commercial products?

a. Understand commercial production processes and machinery used to manufacture products to different scales of production, including:

- i. moulding methods, such as injection, rotational, compression, **extrusion** and blow
- ii. thermoforming and vacuum forming
- iii. die casting and sand casting
- iv. sheet metal forming and stamping
- v. automated material handling systems
- vi. **robotic arms to stack**, assemble, join and paint parts.



b. Understand how the design of jigs, fixtures, presses, formers and moulds in commercial production are used to ensure consistent accuracy and quality, and different scales of production methods.



c. Understand the necessity for manufacturers to optimise the use of materials and production processes, such as:

- economical lay plans and costing; ensuring cost effective production for viability
- working to a budget through efficient manufacture and making the best use of labour and capital throughout the design and manufacturing process.



7.4 How is manufacturing organised and managed for different scales of production?

a. Understand how and why different production methods are used when manufacturing products dependent on market demand, including:

- i. one-off and bespoke, batch and high volume production systems
- ii. modular/cell production systems
- iii. **lean manufacturing**
- iv. just-in-time manufacture
- v. bought-in parts and components, standardised parts
- vi. **fully automated manufacture.**

b. Understand how **ICT and digital technologies** are changing modern manufacturing:

- i. customised manufacture systems
- ii. rapid prototyping
- iii. additive and digital manufacture methods
- iv. stock control, monitoring, purchasing logistics in industry.

7.5 How is the quality of products controlled through manufacture?

a. Understand the processes that need to be undertaken to ensure products meet legal requirements and are high quality:

- i. quality control
- ii. quality assurance
- iii. 'Total Quality Management' (TQM)
- iv. European and British standards.

## 8. Viability of design solutions

Considerations

Maths & Science

DESIGN & MAKING PRINCIPLES

TECHNICAL PRINCIPLES

### 8.1 How can designers assess whether a design solution meets its stakeholder requirements?

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| a. | Critically evaluating how a design solution has met its intended requirements, including: <ol style="list-style-type: none"> <li>functionality</li> <li>ease of use and inclusivity of the solution</li> <li>user needs.</li> </ol>   |  |
| b. | Demonstrate an understanding of the needs and methods for testing design solutions with stakeholders throughout the design development, and when testing the success of a product.  |  |
| c. | Demonstrate an understanding of the importance of testing the feasibility of getting a product to market including considerations of cost, packaging and appeal.  |  |
| d. | Understanding the <b>relevant standards</b> that need to be meet and how to ensure these are delivered, including: <ol style="list-style-type: none"> <li>those published by the British Standards Institute (<b>BSI</b>)</li> <li>those published by the International Organisation for Standardisation (<b>ISO</b>) specific to the subject.</li> </ol> |  |

### 8.2 How can product designers and manufacturers assess whether a design solution meets the criteria of technical specifications?

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| a. | Demonstrate an understanding of the methods and importance of undertaken physical testing on a product to ensure it meets the criteria it is meant to fulfil, including: <ol style="list-style-type: none"> <li>functionality</li> <li>accuracy</li> <li>performance.</li> </ol>  |  |
| b. | Recognise how <b>physical testing</b> systems are integrated into the manufacturing process in the design industry to test functional feasibility, including: <ol style="list-style-type: none"> <li>testing of materials for durability and aftercare</li> <li>testing models and prototypes for performance and fitness for purpose</li> <li>testing products in use through different methods, such as:                 <ul style="list-style-type: none"> <li>○ consumer testing</li> <li>○ virtual testing.</li> </ul> </li> </ol> |  |

### 8.3 How do designers and manufacturers determine whether design solutions are commercially viable?

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| a. | Demonstrate an understanding of the value of <b>feasibility studies</b> to determine the likely factors that influence the commercial viability of a product to market, such as: <ul style="list-style-type: none"> <li>• the design solution's impact on user lifestyles</li> <li>• how well a product performs</li> <li>• technical difficulty of manufacture</li> <li>• stock availability of materials and components</li> <li>• costs and profit</li> <li>• timescales involved</li> <li>• promotion, brand awareness and advertising potential</li> <li>• balancing supply and demand</li> <li>• market analysis of similar products.</li> </ul> |  |
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## 9. Health and safety

Considerations



Maths &  
Science

TECHNICAL PRINCIPLES

### 9.1 How can safety be ensured when working with materials in a workshop environment?

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| <p>a. Demonstrate an understanding of safe working practices in the workshop situation, including:</p> <ul style="list-style-type: none"> <li>i. understanding the need for risk assessments</li> <li>ii. identifying hazards and implementing control measures to minimise risks.</li> </ul> |  |
| <p>b. Demonstrate an understanding of how to work safely with specialist tools, techniques, processes, equipment and machinery during the design and manufacture of products.</p>   |  |

### 9.2 What are the implications of health and safety legislation on product manufacture?

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| <p>a. Demonstrate an understanding of how the regulatory and legislative framework in the <b>Health and Safety at Work Act (HASAW)</b> sets out duties of employers and employees in the product manufacturing industries, including:</p> <ul style="list-style-type: none"> <li>i. Control of Substances Hazardous to Health (COSHH)</li> <li>ii. Personal Protective Equipment at work regulations (PPE).</li> </ul> |   |
| <p>b. The responsibility of manufacturers to <b>appropriately label products</b> and offer guarantees to their consumers to deliver the correct levels of product assurance related to safety.</p>   |  |

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