Objectives

• Be able to select and use materials and components appropriate to a specific task
• Understand how functionality, availability and cost affect the selection of materials and components
How do you get started?

• The hardest part of a design project can be just getting started
  • Designers spend time getting to know their project
  • Know what they are designing, and who it’s for
  • Research existing brands and concepts
  • Select the materials for designing and making

• How might a designer select the appropriate materials to use?

• What factors would be considered in the decision process?
Material selection

- Materials are usually selected for two purposes:
  - Aesthetics
  - Function

- This can create a huge number of choices
  - What factors may affect your choice of material?
Design stage

• Computer Aided Design (CAD) software enables designers to create a precision drawing of the product
  • CAD can produce either a 2D drawing or 3D render
  • Colours and finishes can be trialled
  • Stress loadings and weight distribution can be tested
  • Market research can be conducted to receive early customer feedback

• What are the benefits of creating a virtual version before making a prototype?
Prototypes

• A prototype is a first or preliminary version of a product
  • There are several categories of prototype: It could be a working, visual or functional prototype
  • This enables further testing of functionality and aesthetic appeal
  • 3D printing can help create a precise concept model
  • What are the other benefits of creating a prototype before producing the finished product?
Wire frame

• Visualise your product in a variety of settings
Render a virtual version

- A virtual version may be created by using hand drawing techniques or a CAD render to:
  - Visualise a product in its final setting
  - Test different colours, textures and finishes
  - Gather customer feedback on the proposed design
Considering functionality

• Investigate the functionality of a material to ensure it is appropriate for your prototype. Consider:
  • Strength
  • Movement
  • Conductivity (electrical & thermal)

• What factors would you consider when deciding on how strong the product or component needs to be?

• What could be the outcome of poor testing or a lack of research?
Assessing functionality

• Test your selected material for its strength, movement and conductivity if necessary

• What functions does a lockable money box need to demonstrate?
  
  • Select the appropriate components for the box considering the right weight and strength of materials
  
  • Would you mount the hinge internally or externally?
  
  • Justify a suitable material for the hinge
Worksheet

• Complete **Task 1** of the Worksheet
Component selection

• A component is a part used in a product that is often prefabricated

• Components may:
  • Require specialist machinery to make
  • Be expensive to produce yourself
  • Be time consuming to produce
  • Be purchased in bulk to decrease costs

• Make a list of components that you think would be commonly purchased for a front door
Availability and cost

• Your project maybe affected if chosen components become unavailable
  • What effects could selecting expensive materials have on product development?
  • What other questions should you ask before acquiring raw materials and components for production?
Availability and cost Answers

• Questions you should ask of raw materials and components before commencing production include:
  
  • Is the material available?
  • Is it available in the correct size?
  • Can it be delivered on time?
  • Is there a plentiful supply?
  • Is it cost effective to use?
  • Are there any environmental factors that may affect the availability or ethical use of the product?
Component selection example

• List the components you would buy to make the rucksack and give your reasons why
Project management triangle

• Balancing the cost of your design and managing a deadline will require compromise, as you can only achieve two attributes of the triangle
  • Each side of the triangle represents a constraint
  • What happens when you change one aspect of the triangle?
Finding a balance

• Budget and deadlines can influence the way a product is finally produced
  
  • What factors would you consider when making a variety of pens for different customers?
Worksheet

• Complete **Tasks 2** and **3** of your worksheet
Plenary

• What two factors should be considered when selecting materials?
• How can you test these factors?
• What factors influence buying components over making them?
• What should you consider when batch or mass producing an item?
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