

KS4 Hospitality & Catering

Y11 Unit 1 Term 1

SUBJECT: Engineering

UNIT: Year 10 Term 1

SANDHILL VIEW
EST. 1953



ACHIEVE · ASPIRE · ENJOY

ENGINEERING DESIGN

LEARNING OUTCOME 1: Understand the design cycle and the relationship between design briefs and design specifications

TOP TIP

To easily remember the stages of the design cycle – remember the acronym:

IDOV

- I - IDENTIFY
- D - DESIGN
- O - OPTIMISE
- V - VALIDATE

THE DESIGN CYCLE

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The design cycle covers the stages of Engineering Design from the initial design brief through to manufacturing the product and testing and evaluation. This cycle sets out the order and tasks that are generally completed when a new product is being designed and is what designers will follow to successfully bring a new product to market.

- o STAGE 1: **IDENTIFY** phase – brief – research – process planning
- o STAGE 2: **DESIGN** phase – specification – design – manufacturing plans
- o STAGE 3: **OPTIMISE** phase (e.g. virtual, physical) – model and prototype – error proofing
- o STAGE 4: **VALIDATE** phase (e.g. virtual, physical) – test – evaluate



I IDENTIFY phase

BRIEF – a discussion between the client and the designer will create an initial **DESIGN BRIEF** that outlines the product to be designed.

RESEARCH – is the investigation into materials to be used, manufacturing methods, look at other existing and iconic products. This process will help you design a better suited product.

PROCESS PLANNING – is the connection between design and manufacturing. In this stage the use of CAM (Computer Aided Manufacture) processes are planned out with regards to creating CAD (Computer Aided Design) files, timescale and resources needed.

D DESIGN phase

SPECIFICATION – is a set of criteria that a design must meet in the design and manufacture stages. The specification points are set from a design brief.

DESIGN – a range of draw and sketched ideas are created that meet the specification created. The design could then be discussed with the client/target market for suggested improvements.

MANUFACTURING PLANS – plans are made as to the stages of production. Tools and equipment, time, health and safety and quality assurance will all be included in a detailed manufacturing plan.

O OPTIMISE phase

MODEL AND PROTOTYPE – modelling can be either physical or virtual. With virtual modelling we use a 3D software (for example Google Sketch Up) to model the product. Physical models are generally made from modelling foam or card for speeds and ease. Models are used to test ideas, shape, size, aesthetics and methods of production.

ERROR PROOFING – error proofing refers to the reduction or elimination of human error when using the product, for example instructions to show which way to insert batteries. The model will be tested for any improvement that could be made.

V VALIDATE phase

MANUFACTURING – the products components are manufactured using a range of manufacturing processes. They are then assembled together to create the final outcome. During the manufacturing stages quality control measures should be in place to check the quality of each stage of manufacture to ensure a good outcome.

TEST – the product is tested with the client and target market for its suitability and functionality within its working environment.

EVALUATE – the product is finally evaluated and further improvements suggested and developed.

COMMON EXAM TERMINOLOGY

IDENTIFICATION OF DESIGN NEEDS

INITIAL DESIGN BRIEF FROM THE CLIENT	INFORMATION WHICH MAY INFORM THE DESIGN BRIEF
– SITUATION and CONTEXT that has led to the brief – NEEDS of the client: – corporate branding – eye catching logo, colour scheme and direction for company – target audience – who is the product aimed at, who are the likely buyers/consumers of the product? – PURPOSE of the product – is the product there to solve a problem? – FUNCTIONS of the product – what will the product need to do, will it have more than one primary function?	– MARKET RESEARCH: – focus groups, – surveys, – needs of target market, – consumer trends – STRENGTHS & WEAKNESSES of competitors' products – product analysis looks at similar products on the market that could give inspiration – IMPROVEMENTS in materials – research into new and modern materials – NEW PRODUCTION PROCESSES – new manufacturing methods – BUDGET – the FUNDS available

THE RELATIONSHIP BETWEEN A DESIGN BRIEF & A DESIGN SPECIFICATION

CLIENT PROVIDES INITIAL BRIEF	The client will approach the designer with an initial design brief, a product or project that they would like the designer to take on. It is usually a problem that they would like the designer to solve with a suitable product or service.
DISCUSSION BETWEEN CLIENT & DESIGNER	The discussion will usually cover what the client wants from the design, what is possible, what can be done within budget, essential and desirable aspects, timeframe, the quantity of the product to be made and the environment that it will be used in.
FURTHER RESEARCH	Further research will look at materials, manufacturing methods, other similar and iconic products, assembly methods such as use of standard components. This process will involve further discussions with the client to reveal findings.
FINAL BRIEF	From the research and discussions with the client a FINAL BRIEF will be developed that will set out the goals to be achieved by the product/project. From this a suitable SPECIFICATION can be established and taken into the DESIGN stage of the project.