

KIST DP Course Descriptions 2011-2012

Group: Group 4

Level: HL/SL

Subject: Design Technology

Grade: 11

Unit Number: 1

Unit Title: Design process

Approximate Duration: 3 weeks

Key Concepts:

The design cycle model and the design process

Generating ideas

Communicating ideas

LP Link: Inquirer

TOK Link(s):

How can problems be solved?

Description of the Unit:

This unit introduces the design cycle model which is a fundamental concept underpinning the design process and is central to student understanding of design activities. Each element of the design cycle represents how designers progress through the design process to refine the design solution in increasing detail. The unit then moves on to focus on the strategies that designers use to arrive at solutions to problems and the varied nature of the skills and knowledge they need to carry out their activities successfully. The skills identified in this unit are expected to be demonstrated in the internal assessment practical work and are reinforced throughout the course.

Key Knowledge/Skills Addressed:

Describe how designers use design cycle models to represent the design process.

Explain the role of the designer in the design process.

Explain how design work is often a combination of incremental and radical thinking.

Identify a design context where constructive discontent has been the primary generator of ideas.

Discuss why designers use a variety of techniques to develop ideas.

Explain the purpose of different drawing methods.

Outline advantages and disadvantages of using CAD instead of traditional drawing methods.

Describe models as representations of reality and representing selected features of a design.

Outline the advantages and disadvantages of graphical, physical and mathematical models.

Main Summative Assessment of the Unit: DP Past Paper Exam

KIST DP Course Descriptions 2011-2012

Group: Group 4

Level: HL/SL

Subject: Design Technology

Grade: 11

Unit Number: 2

Unit Title: Product innovation

Approximate Duration: 2 weeks

Key Concepts:

Designers and the product cycle

Invention and innovation

People and markets

LP Link: Inquirer

TOK Link(s):

How and why are new products created?

Description of the Unit:

Innovation and the continuous development of new and improved products are key to the design process. This unit considers the relationship between the design cycle and the product cycle. It moves on to explore the role of invention in innovation and the impact of market pull and technology push on product innovation. Establishing and developing markets for products are a critical element of the product cycle.

Key Knowledge/Skills Addressed:

Discuss the role of the designer in the product cycle.

Compare the design cycle with the product cycle.

Discuss why for many products the product cycle has shortened.

Discuss the importance of science to invention and innovation.

Discuss the importance of technology to invention and innovation.

Explain the difficulties of getting a product to diffuse into the marketplace.

Explain why innovators may have difficulty in obtaining financial support for an invention.

Describe a strategy that a company would use to enhance market penetration.

Describe how a company would undertake market development.

Describe one example of how a company undertakes product development.

Discuss an example of a robust design that evolved into a product family.

Main Summative Assessment of the Unit: DP Past Paper Exam

KIST DP Course Descriptions 2011-2012

Group: Group 4

Level: HL/SL

Subject: Design Technology

Grade: 11

Unit Number: 3

Unit Title: Green design

Approximate Duration: 2 weeks

Key Concepts:

Principles of green design

Life cycle analysis

Strategies for green design

LP Link: Thinker

TOK Link(s):

Can the adverse impact of technologies be minimized?

Description of the Unit:

Green design involves taking a “cradle to grave” approach to the design of a product by considering the adverse impacts of the product at all stages of its life (pre-production, production, distribution, including packaging, utilization and disposal) and seeking to minimize those impacts. This unit outlines a number of green strategies designers must consider in the design of new products.

Key Knowledge/Skills Addressed:

Outline the reasons for green design.

Discuss the impact of “take back” legislation on designers and manufacturers.

Describe how life cycle analysis provides a framework within which clean production technologies and green design can be evaluated holistically.

Explain how eco-labelling and energy-labelling schemes can help consumers to compare potential purchases.

Describe how designers can modify the environmental impact of the production, use and disposal of their product through careful consideration at the design stage.

Describe how reuse, repair, reconditioning and recycling contribute to the optimization of resource utilization.

Discuss the issues underpinning the economic recycling of materials.

Discuss strategies that designers could employ to design for disassembly.

Main Summative Assessment of the Unit: DP Past Paper Exam

KIST DP Course Descriptions 2011-2012

Group: Group 4

Level: HL/SL

Subject: Design Technology

Grade: 11

Unit Number: 4

Unit Title: Materials

Approximate Duration: 1 month

Key Concepts:

Introducing and classifying materials

Properties of materials

Timber, Metals, Plastics, Ceramics & Composites

LP Link: Knowledgeable

TOK Link(s):

What makes a material different?

Description of the Unit:

Though designers choose the materials they use for several reasons, the principle reason for choosing a material remains the materials ability to do its job without failing. This ability to do a specified job is based on the physical and mechanical properties of that material. This unit explores the intimate relationship between materials & design and promotes a greater knowledge and understanding of the attributes and capabilities of a variety of materials.

Key Knowledge/Skills Addressed:

Describe how materials are classified into groups according to similarities in their microstructures and properties.

Describe the structure of natural timber.

Outline criteria for the selection of timber for different structural and aesthetic design contexts.

Draw and describe a metallic bond.

Explain the effect of alloying on malleability and ductility.

Describe a covalent bond.

Discuss the issues associated with the disposal of plastics.

Explain that the desired characteristics of glass can be accurately determined by altering its composition.

Explain why glass is increasingly used as a structural material.

Identify a range of composites.

Main Summative Assessment of the Unit: DP Past Paper Exam

KIST DP Course Descriptions 2011-2012

Group: Group 4

Level: HL/SL

Subject: Design Technology

Grade: 11

Unit Number: 5

Unit Title: Product development

Approximate Duration: 2 weeks

Key Concepts:

Manufacturing techniques

Craft production, Mechanization, Automation

Economic considerations, Clean manufacturing

LP Link: Thinker

TOK Link(s):

What factors influence how products are manufactured?

Description of the Unit:

Designers need to understand a wide range of manufacturing processes and techniques to be able to design feasible solutions. This unit outlines the main manufacturing processes and techniques and how different processes link together in the manufacture of a product.

Also, scales of production are identified and discussed, as well as emerging clean manufacturing technologies that cause less environmental damage.

Key Knowledge/Skills Addressed:

Outline the techniques of moulding, casting, weaving, fusing, stitching, cutting, machining, abrading, using adhesives and using fasteners.

Discuss advantages and disadvantages of using different techniques to manufacture products.

Discuss the importance of craft production for developed and developing countries.

Describe how the availability of new sources of power in the Industrial Revolution led to the introduction of mechanization.

Outline the advantages and disadvantages of mechanizing a production process.

Explain how CAD, CAM and CNC contribute to an automated production system.

Outline how automation has improved the type and range of products available to consumers.

List the costs that contribute to the final cost of a product.

Explain why the introduction of mass production increased damage to the natural environment.

Explain how legislation provides an impetus to manufacturers to clean up manufacturing processes.

Main Summative Assessment of the Unit: DP Past Paper Exam

KIST DP Course Descriptions 2011-2012

Group: Group 4

Level: HL/SL

Subject: Design Technology

Grade: 11

Unit Number: 6

Unit Title: Product design

Approximate Duration: 1 week

Key Concepts:

Ergonomics

The designer and society

LP Link: Principled

TOK Link(s):

How do social responsibilities impact on the design of products?

Description of the Unit:

This unit looks at just some of the responsibilities facing a designer when developing new products. These include ergonomic considerations such as designing with the user in mind, the user-product interface, issues regarding aesthetics and form versus function. Also, social and moral responsibilities are discussed, along with planned obsolescence, fashion versus quality and value for money.

Key Knowledge/Skills Addressed:

State that ergonomics is multidisciplinary, encompassing anthropometrics, psychological factors and physiological factors.

Discuss moral and social responsibilities of designers in relation to green design issues.

Outline how planned obsolescence influences the design specification of a product.

Describe the advantages and disadvantages of planned obsolescence to the designer, manufacturer and consumer.

Evaluate the influence of fashion and planned obsolescence in relation to the quality and value of a product.

Explain how aesthetic considerations affect the design of products.

Discuss the conflict that a designer faces when attempting to balance form with function in the design of products.

Main Summative Assessment of the Unit: DP Past Paper Exam

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Grade: 11

Unit Number: 7

Unit Title: Evaluation

Approximate Duration: 2 weeks

Key Concepts:

Evaluation and designing

Evaluation and manufacturing

Evaluation and the consumer

LP Link: Reflective

TOK Link(s):

How is the success of a product determined?

Description of the Unit:

This unit focusses on how to evaluate using a range of techniques and approaches. Evaluation at key stages in the product life cycle is discussed from the perspectives of the designer, manufacturer and consumer.

Key Knowledge/Skills Addressed:

Outline the general criteria used to evaluate products.

Explain the use of qualitative and/or quantitative tests, models and experiments used to evaluate ideas at the design development stage

Identify the nature of evaluation at different stages of the product cycle.

Explain the importance of cost-effectiveness to manufacturers.

Compare quality control with quality assurance for manufactured products.

Compare price with value when assessing a product for value for money.

Explain how consumers apply criteria to evaluate a product for value for money, referring to before purchase, purchase, initial use and long-term use.

Explain the relevance of quality assurance to consumers.

Discuss the role of consumer associations for product evaluation.

Explain the contribution of the media and education to product evaluation.

Main Summative Assessment of the Unit: DP Past Paper Exam