

Unit 94: Small-scale Design

Unit code:	H/502/5265
QCF Level 3:	BTEC National
Credit value:	10
Guided learning hours:	60

● Aim and purpose

This unit will develop learners' skills in using small-scale design methods, by carrying out a design brief, analysing requirements, developing ideas and producing outcomes and reviewing the process at all stages.

● Unit introduction

This unit is designed to provide learners with an understanding of the scope of small-scale 3D design and manufacture. Learners will develop skills in small-scale design and production by exploring the range of possible work and experimenting with appropriate materials, techniques and processes to produce models, prototypes and other small-scale outcomes.

The range of small-scale work covered in this unit could include model making, design of domestic ware and utensils, products, architectural detailing, fixtures and fittings, small electrical and electronic equipment, accessories, special effects or medical equipment.

Professional designers have to be able to analyse briefs accurately and identify which factors need to be taken into account when developing their response. Learners should study the work of contemporary and historical designers to explore, experiment with and understand how to use specialist materials and techniques relevant to their brief. Learners will develop the skills needed to analyse and interpret a brief for a small-scale design project. They will be able to interpret the functional and aesthetic requirements of the brief, according to the specialist area of design, and consider the requirements of the client, consumer or users of the product.

Learners will be able to research and plan a small-scale design project. They will identify relevant sources of information that relate to the considerations that need to be taken into account when developing design ideas. Learners will also investigate the needs and wants of the client or users in order to develop ideas. They will be able to use their time effectively in order to generate a range of potential design ideas to meet the brief. These developments may take the form of sketches, models or digitally realised ideas. Learners will present proposed design solutions as part of the process of reaching a final design.

Learners will be able to utilise a range of materials, techniques and technologies in order to produce models, mock-ups and prototypes, of an appropriate scale and precision, for small-scale 3D products. As part of this, learners must make appropriate decisions about the materials and techniques to be utilised in order to meet the requirements of the brief. This may involve testing and should involve displaying or presenting 3D outcomes.

All designers need to carry out ongoing analysis and evaluation of their progress against a given brief in order to make sure that, creatively, it meets the requirements of that brief. Learners will be able to review their work against a range of criteria in order to realise the potential of a small-scale design.

● Learning outcomes

On completion of this unit a learner should:

- 1 Understand the purpose of a small-scale design project
- 2 Be able to develop and propose design ideas
- 3 Be able to realise small-scale design outcomes.

Unit content

1 Understand the purpose of a small-scale design project

Aesthetic requirements: eg appearance, style, fashion and relationship to environment

Functional requirements: eg type, size, weight, performance, durability and serviceability

Client: eg consumer, business, company, entertainment industry, creative industries, heritage, architect, engineer, community, planning department, jeweller, craft centre, spiritual, animator, end user, learner, technician, manufacturer

Purpose: intentions; fit for purpose; constraints; potential; focus

2 Be able to develop and propose design ideas

Identifying sources: eg ecological, environmental, public health and safety factors

Client and user needs: eg market potential, aesthetic, functional, materials, techniques, processes, cost

Initial ideas: eg draft models, drawings, photographs, audio-visual presentation

Developing designs: eg preparation, working drawings, computer-aided designs (CAD) orthographic representations; consulting clients and users

Presenting: demonstrating potential design ideas; rationale; alternatives eg DTP, notes, visuals; selecting materials and methods; construction; materials; properties eg strength, durability, weight, size, manageability, one-off, mass manufacture; space required; safety, environmental considerations, reliability; testing eg requirements, brief, accuracy, component fit, storage, display, marketing

Review: planning; time management; costs eg competing products, limits, design decisions; quality eg aesthetic, functional, technical; development eg skills, understanding; communication eg presentation; record findings eg written, verbal

3 Be able to realise small-scale design outcomes

Realise outcomes: eg models for animation, maquettes, jewellery, sets, architects, models, nano technology, planning proposals, advertising, toys, scale models, exhibitions

Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

Assessment and grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:	To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:
P1 explain the purpose of a brief for a small-scale design project [IE, CT]		
P2 develop and propose design ideas [IE, CT, SM]	M1 show independence in carrying out purposeful and confident design development	
P3 review design ideas [IE, CT, RL, SM, EP]	M2 use analysis, testing and evaluation throughout the project to produce a final outcome that meets the brief and creatively exploits the potential and limitations of small-scale design.	D1 show an individual, exciting and perceptive approach 'and critical understanding' in creating and presenting functionally and aesthetically assured small-scale developmental and final work.
P4 realise small-scale design outcomes.		

PLTS: This summary references where applicable, in the square brackets, the elements of the personal, learning and thinking skills applicable in the pass criteria. It identifies opportunities for learners to demonstrate effective application of the referenced elements of the skills.

Key	IE – independent enquirers	RL – reflective learners	SM – self-managers
	CT – creative thinkers	TW – team workers	EP – effective participators

Essential guidance for tutors

Delivery

This unit is best delivered through an ongoing design brief or briefs, in order that the full cycle of analysing, developing and producing a critically thought out solution can be achieved coherently.

This unit is closely related to specialist *Small-scale Working* and would normally be taught as the second stage of a complete programme. It is, however, possible to devise an integrated programme in which the two units are separated, only for assessment purposes. If this method is chosen, care must be taken to ensure that sufficient exploratory and preparatory work is undertaken in order to provide a sound basis for design development leading to properly finished work. Understanding professional practice should be emphasised in this unit.

This unit is most purposefully delivered through an ongoing design brief or briefs, in order that the full cycle of analysing, developing and producing a critically thought out solution can be coherently achieved.

Learning outcome 1 reflects the initial stages of receiving and analysing a design brief. Learners will need to learn how to interpret the aesthetic and functional requirements of a brief for small-scale 3D design outcomes. The brief will vary according to the area of 3D design, for example product, architecture, theatre props, special effects, medicine, education or retail.

Learners will need to adopt a systematic but wide ranging approach, analysing the brief and undertaking research. An approach that emphasises the consideration of both aesthetic and functional requirements should be encouraged. At this stage of a brief, learners may work in groups to explore different aspects of analysis and research.

For learning outcome 2, learners will need to learn how to produce effective plans for small-scale design projects that meet the requirements of the brief. This involves time management, material preparation, making processes, sequences, modifications and the involvement of clients, consumers and users.

The research element of learning outcome 2 develops directly as a result of the analysis of the brief and learners should be encouraged to explore research possibilities away from the specialism that they may be following, drawing inspiration from a variety of sources. In areas such as product design there will inevitably be a need for research into functional aspects such as materials and mechanisms. However, this should not detract from a lively and innovative view of research that exploits primary sources. Learners should plan their work through the research stages in order to manage their time adequately when moving on to the development and realisation stages of the unit. In undertaking the development of design ideas, learners should utilise a range of 2D, 3D and digital media creatively. They can use annotated worksheets or sketchbooks to document aspects of the critical process involved in learning outcome 3.

For learning outcomes 2 and 3, access to appropriate making resources is essential. Learners will need to learn how to produce models, or mock-ups, and prototypes of an appropriate scale and precision for small-scale 3D products.

For learning outcome 3, learners should be encouraged to explore 3D ideas and to investigate a range of alternative materials in the process of creating a final outcome. Learners should experiment with materials and processes creatively and record critical opinions via worksheets or sketchbooks. While engaged in any 3D making activities, learners should be fully aware of all relevant health and safety requirements for the materials and processes they are using.

Learners will need to learn how to carry out ongoing analysis to review the progress of their work in designing small-scale 3D products to meet briefs.

Learners should be encouraged to discuss their own, their peers' and others' views of their own designs and the design work of others. Learners will need to be able to use the correct technical terms when talking about the materials and techniques they have used and how they meet the aesthetic and functional criteria identified in the brief. Regular feedback should be given to learners through day-to-day discussion and formal and informal interim assessment. Evidence of evaluation for learning outcome 3 can also take the form of notes, formal evaluative statements and records of verbal feedback.

Outline learning plan

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan demonstrates one way in planning the delivery and assessment of this unit.

Topic and suggested assignments/activities and/assessment

Introduction to the unit and structure of the programme Include a tour of the design department and discussion on health and safety issues

Assignment 1: Safely Contained – group discussion how this brief could be interpreted. To include ideas for research and appropriate 3D design materials and techniques eg packaging, ceramics, theatre design.

Safely Contained brief:

- Research on the theme.
- Produce a plan for their project.
- Develop initial ideas to meet the brief by selecting appropriate materials, techniques and processes.
- Develop and present design ideas, producing prototypes for their final outcomes.
- Review and evaluate their working methods and produce final outcomes in response to the brief.
- Evaluate their work and present outcomes to the group (P3).

Assignment 2: Insects – group discussion on how this brief could be interpreted. To include ideas for research and appropriate 3D design materials and techniques eg jewellery, product design, special effects.

Learners:

- Research on the theme of.
- Produce a plan for their project.
- Develop initial ideas to meet the brief by selecting appropriate materials, techniques and processes.
- Develop and present design ideas, producing prototypes for their final outcomes.
- Review and evaluate their working methods and produce final outcomes in response to the brief.
- Evaluate their final work for the unit and present outcomes to the group.

Assessment

For P1 and P2, learners will be expected to use a range of analytical, research and making skills safely and effectively, and to be able to communicate and present those ideas clearly and effectively. Analysis and research should be clearly recorded and should represent a wide ranging approach to the initial stages of a design project. Learners are expected to use a range of skills and strategies in undertaking and completing a small-scale design project. They should have a range of models, experiments or prototypes that illustrate the development of their ideas towards a final design outcome. Evidence may also be provided through records of design developments or experiments in worksheets, sketchbooks, folders of notes or collected material, which demonstrate a clear understanding of the critical and creative process.

For P3, learners need to use the correct terminology when discussing their work and to review the functional and aesthetic qualities involved. There should be an effective level of reflection regarding learners choices, design decisions and use of materials and techniques. This could be achieved through formal evaluations, annotated sketches or worksheets, a presentation to the class or witness statements as part of a project. Guidance on the use of witness statements and observation records is provided on the Edexcel website. When using any of these methods, learners will need to evidence their understanding of the properties of media, materials and techniques.

For P4, learners need to demonstrate their ability to realise all aspects of a proposal or brief. Assessment evidence should be gathered from work produced specifically for a small-scale design. Evidence will be primarily practical, with verbal presentations being supported by the practical work. Witness statements or video recordings may also supplement the presented work or presentations.

For M1, learners should be able to analyse and research a design brief in a purposeful and confident manner. Learners will demonstrate independence in their work, showing a progression of ideas leading to a final outcome. Tutors should expect learners to experiment with and develop ideas independently using their understanding of design and the relevant materials and processes safely.

For M2, learners need to demonstrate a deeper understanding and analysis of media, materials and techniques throughout the project. They will be able to demonstrate a greater awareness of skills and knowledge they have gained when discussing of their work and to again use the correct technical terms.

For D1, learners are required to produce an individual and exciting body of work that demonstrates a creative and perceptive approach to the design process. Learners will critically review and refine their ideas and decisions at all stages of the work and produce outcomes that reflect of a rigorous and creative process. Final outcomes will reflect in-depth consideration of functional criteria and an assured aesthetic understanding.

Programme of suggested assignments

The table below shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the assessment and grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any Edexcel assignments to meet local needs and resources.

Criteria covered	Assignment title	Scenario	Assessment method
PI, P2, P3, P4 MI, M2 DI	Assignment 1: Safely Contained Possible visits to galleries, museums, designer studios	A designer analyses a brief from a pharmaceutical supplier in terms of aesthetic and functional requirements and client needs, develops and produces a personal interpretation.	Portfolio of evidence consisting of: <ul style="list-style-type: none"> • research showing the development of ideas • a range of sketches, trials, samples, swatches, thumbnails etc • evidence that health and safety practice in the studio or workshop has been observed • final outcome • presentation.
PI, P2, P3, P4 MI, M2 DI	Assignment 2: Insects Possible visits to galleries, museums, designers' studios.	A designer analyses a brief for a jewellery range based on specific insect forms displayed in a local wildlife centre, in a terms of aesthetic and functional requirements and client needs, develops and produces a personal interpretation.	Portfolio of evidence consisting of: <ul style="list-style-type: none"> • research showing the development of ideas • a range of sketches, trials, samples, swatches, thumbnails etc • evidence that health and safety practice in the studio or workshop has been observed • final outcome • presentation.

Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit forms part of the BTEC Art and Design sector suite. This unit has particular links with the following unit titles in the BTEC Art and Design suite:

Level 1	Level 2	Level 3
Explore 3D Design	Working with 3D Design Briefs	3D Design, Media, Techniques and Technology
Explore 3D Design Crafts	Working with 3D Design Crafts Briefs	Small-scale Working

National Occupational Standards

This unit also provides development opportunities for some of the underpinning skills, knowledge and understanding of the following National Occupational Standards:

CCSkills Sector Skills Council

Design (revisions in draft form June 2009)

- DES2 Apply design industry knowledge to inform your own design work practice and work
- DES5 Follow a design process
- DES6 Work effectively with others in a creative environment
- DES7 Contribute to the production of prototypes, models, mock-ups, samples or test pieces
- DES8 Explore the use of colour in a creative environment
- DES9 Research, test and apply techniques for the design of products
- DES18 Interpret the design brief and follow the design process
- DES24 Create 3D Models using a Computer Aided Design System
- DES28 Developing your own design offer
- DES36 Develop and extend your design skills and practices
- DES38 Manage design realisation
- DES39 Manage a design project.

Essential resources

Learners will need access to a range of visual and technical resources, which could include photographic facilities. Workshop areas should be equipped to a good standard for working with a wide range of materials and/or include a separate area for wet work and mould making and a heat treatment area with appropriate extraction facilities. Studio areas for drawing and preparation should be appropriately equipped and there should be adequate storage space for work.

Learners may also need access to a range of digital applications as part of their experience in covering the learning outcomes. Library and learning facilities that enable learners to access examples of 3D design work should be available.

Employer engagement and vocational contexts

Centres should develop links with local business, industry and practising artists, craftspeople and designers to support the vocational content of the unit and programme.

Links with employers are essential to the delivery of the programme for work experience and future employment.

Vocational learning support resources:

- Learning and Skills Network – www.vocationallearning.org.uk

Business and finance advice:

- local and regional Business Link – www.businesslink.gov.uk

Creative and cultural skills (www.ccskills.org.uk), the sector skills council for arts, crafts and design have launched the web portal Creative Choices (www.creative-choices.co.uk). This portal has a range of information about careers in the arts, crafts and design sector, including job descriptions.

Assignments should be vocationally relevant; centres should consider the delivery of 'live projects' for example to support the vocational content of the unit and programme.

Open days at FE and HE establishments also broaden learners' horizons and show a variety of examples of design presentations and the effects on the audience of the methods chosen.

Learners should be exposed to as wide a range of materials, methods and techniques as possible, from notebook presentations through to online galleries. Reviews of museum/gallery visits, online exhibitions or virtual galleries may be used to support this process.

Indicative reading for learners

Textbooks

Bosworth J – *Ceramics with Mixed Media* (A&C Black Publishers Ltd, 2006) ISBN 978-0713667714

Cohen D and Anderson S – *A Visual Language: Elements of Design* (A&C Black Publishers Ltd, 2006) ISBN 978-0713667738

Currell D – *Puppets and Puppet Theatre* (The Crowood Press, 1999) ISBN 978-1861261359

De Marco G and P – *Building Architectural Models* (Schiffer Publishing Ltd, 1999) ISBN 978-0764310713

Dormer P – *The Culture of Craft* (Manchester University Press, 1997) ISBN 978-0719046186

Genders C – *Sources of Inspiration: For Ceramics and the Applied Arts* (A & C Black Publishers Ltd, 2004) ISBN 978-0713670981

Greenhalgh P – *The Persistence of Craft* (A&C Black Publishers Ltd, 2002) ISBN 978-0813532646

Neat D – *Model Making: Materials and Methods* (The Crowood Press, 2008) ISBN 978-1847970176

Oliver E – *Jewellery Making Techniques Book* (Apple Press, 2001) ISBN 978-1840923360

Oliver E – *The Jeweller's Directory of Shape & Form* (A&C Black Publishers Ltd, 2000) ISBN 978-0713654875

Osborne C – *Small-scale Modelling* (The Crowood Press, 2000) ISBN 978-1861262288

Piper T – *Model making for the Stage* (The Crowood Press, 2004) ISBN 978-1861266903

Samara T – *Design Elements: A Graphic Style Manual* (Rockport, 2007) ISBN 978-1592532612

Sutherland M – *Modelmaking: A Basic Guide* (WW Norton & Co, 1999) ISBN 978-0393730425

Wilson A – *Making Stage Props: A Practical Guide* (The Crowood Press, 2003) ISBN 978-1861264503

Journals

Architectural Review

Creative Review

Design Week

New Design

RA

Tate Etc magazine

Wallpaper

Websites

www.artchive.com

www.theaoi.com

www.cnac-gp.fr

www.craftscouncil.org.uk

www.designmuseum.org.uk

www.designmuseum.org.uk

www.guggenheim.org

www.iconeye.com

www.metmuseum.org

www.moma.org

www.nationalgallery.org.uk

www.npg.org.uk

www.newbritishartists.co.uk

www.photonet.org.uk

www.royalacademy.org.uk

www.saatchi-gallery.co.uk

www.tate.org.uk

www.vam.ac.uk

The Artchive

The Association of Illustrators

Centre Pompidou, Paris

Crafts Council

Design Museum

Design Council

Guggenheim museum, New York

online version of architecture and design magazine

The Metropolitan Museum of Art, New York

The Museum of Modern Art

National Gallery

National Portrait Gallery

site promoting British artists using traditional techniques

The Photographers' Gallery

Royal Academy

Saatchi Online

Tate Online

Victoria & Albert Museum

Delivery of personal, learning and thinking skills

The table below identifies the opportunities for personal, learning and thinking skills (PLTS) that have been included within the pass assessment criteria of this unit.

Skill	When learners are ...
Independent enquirers	planning and carrying out research
Creative thinkers	generating ideas and exploring possibilities for the research, development and presentation of their work
Reflective learners	reviewing and reflecting on their work and acting on the outcomes to modify, refine and improve their work
Team workers	taking part in group discussions to analyse the brief taking part in group presentations of work and commenting on the work of others
Self-managers	producing effective plans for the development of their design projects organising time and resources and prioritising actions when producing work for the brief.

Although PLTS are identified within this unit as an inherent part of the assessment criteria, there are further opportunities to develop a range of PLTS through various approaches to teaching and learning.

Skill	When learners are ...
Independent enquirers	using own initiative to investigate possible sources for research researching a wide range of media, methods and techniques
Creative thinkers	reviewing and reflecting on their research and acting on the outcomes to modify and improve their own work trying out alternative media and techniques adapting their ideas as circumstances change deciding on the most effective final outcome
Reflective learners	setting goals for their final outcomes inviting feedback on their own work and dealing positively with both praise and criticism evaluating their experiences and learning to inform future progress
Team workers	working with others during group presentations working with technical staff to achieve a high level of professionalism
Self-managers	discussing and action planning presentation methods and techniques to be used in own work planning exhibition layout.

● Functional Skills – Level 2

Skill	When learners are ...
ICT – Use ICT systems	
Select, interact with and use ICT systems independently for a complex task to meet a variety of needs	researching presentation methods
Use ICT to effectively plan work and evaluate the effectiveness of the ICT system they have used	planning their own presentations
Manage information storage to enable efficient retrieval	storing research
Follow and understand the need for safety and security practices	observing health and safety recommendations
ICT – Find and select information	
Select and use a variety of sources of information independently for a complex task	researching a variety of presentation methods and adapting them for their own use
Access, search for, select and use ICT-based information and evaluate its fitness for purpose	exploring, extracting and assessing the relevance of information from design websites
ICT – Develop, present and communicate information	
Enter, develop and format information independently to suit its meaning and purpose including: <ul style="list-style-type: none"> • text and tables • images • numbers • records 	presenting their research
Present information in ways that are fit for purpose and audience	presenting their own work to an audience
Evaluate the selection and use of ICT tools and facilities used to present information	evaluating the success of their design work
Select and use ICT to communicate and exchange information safely, responsibly and effectively including storage of messages and contact lists	communicating with other members of the group
Mathematics	
Understand routine and non-routine problems in a wide range of familiar and unfamiliar contexts and situations	understanding estimation and calculation when planning design work using estimation and calculation to work out timings for their presentations

Skill	When learners are ...
English	
Speaking and listening – make a range of contributions to discussions and make effective presentations in a wide range of contexts	discussing own presentations in group critiques
Reading – compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions	researching across a wide range of design techniques and evaluating accordingly
Writing – write documents, including extended writing pieces, communicating information, ideas and opinions, effectively and persuasively	producing detailed plans for their work writing critical evaluations of their work.