

Unit Title:	3D realisation for product development
OCR unit number	5
Level:	2
Credit value:	4
Guided learning hours:	40
Unit reference number	D/503/5857

Unit purpose and aim

This unit gives learners the opportunity to develop ideas using 3D modelling including model making and prototyping in a range of formats and materials.

Learners will develop models in a range of materials to test their initial designs. in relation to form, fit and function with consideration to ergonomics, anthropometrics scale and accuracy. Learners will also explore the use of resistant materials together with a range of different model making equipment. They will reflect on the suitability of the material and techniques they have used. Learners will gain experience of generating presentation models that can be used to communicate their final design ideas to a client.

Learning Outcomes	Assessment Criteria	Teaching Content
<p>The Learner will:</p> <p>1 Know the characteristics and properties of model making techniques and materials</p>	<p>The Learner can:</p> <p>1.1 Identify materials used in model making</p> <p>1.2 Describe advantages and limitations of model making materials</p> <p>1.3 Identify techniques of model making</p>	<p>Materials:</p> <ul style="list-style-type: none"> ○ card ○ foam ○ foam board ○ clay ○ wood ○ metals ○ plastics <p>Advantages and limitations of materials include:</p> <ul style="list-style-type: none"> ○ material properties ○ cost ○ availability <p>Model making techniques:</p> <ul style="list-style-type: none"> ○ vacuum forming ○ rapid prototyping ○ milling and turning ○ card modelling ○ foam modelling ○ clay ○ digital scanning

Learning Outcomes	Assessment Criteria	Teaching Content
	1.4 Describe advantages and limitations of model making techniques	<ul style="list-style-type: none"> • Advantages and limitations of model making: <ul style="list-style-type: none"> ○ fitness for purpose ○ cost ○ availability ○ time
2 Be able to use model making materials and techniques to produce product concepts	2.1 Select appropriate model making materials 2.2 Select appropriate model making techniques 2.3 Produce models to scale	<ul style="list-style-type: none"> • Define product concept modelling: <ul style="list-style-type: none"> ○ components ○ complete product ○ assemblies • Models to scale: <ul style="list-style-type: none"> ○ 1:1 ○ 1:2 ○ 1:50 • Finishing techniques: <ul style="list-style-type: none"> ○ sanding ○ spraying ○ powder coating ○ vinyl application
3 Be able to use model making materials and techniques to present a final product outcome	3.1 Select appropriate model making materials 3.2 Select appropriate model making techniques 3.3 Produce a multiple component final product outcome	<ul style="list-style-type: none"> • Define final product outcome modelling: <ul style="list-style-type: none"> ○ components ○ complete product ○ assemblies • Models to scale • Quality finishing techniques
4 Be able to evaluate the success of final product outcome	4.1 Evaluate suitability and success of selected materials and techniques 4.2 Evaluate success of final product outcome	<ul style="list-style-type: none"> • Evaluation techniques; <ul style="list-style-type: none"> ○ identifying success criteria ○ use of photography ○ testing ○ annotation ○ drawing of design modifications <ul style="list-style-type: none"> ▪ overlays ○ fit and function ○ suitability of surface finish

Learning Outcomes	Assessment Criteria	Teaching Content
	4.3 Identify improvements that can be made to final product outcome	<ul style="list-style-type: none"> ○ dimensional accuracy ○ client feedback. ○ reviewing modelling techniques ○ alternative techniques

Assessment

This unit is centre assessed and externally verified. In order to achieve the unit you must produce a portfolio of evidence which, on request, will need to be made available to the OCR external verifier. Portfolios of work must be produced independently and Centres must confirm to OCR that the evidence is authentic.

Evidence requirements

Learners will identify appropriate modelling materials and make a range of initial concept models and will produce **one** accurate, highly finished, presentation quality multiple component model.

Learners will evidence that their models are made to an accurate scale. They will evaluate the success of final product outcome. This evaluation should be recorded using photographic and/or drawn evidence supported with annotation.

Guidance on assessment and evidence requirements

Tutors should ensure that this unit is themed around a specific client brief. It may be a continuation of unit 3. Learners should be given opportunity to experiment with a range of materials.

Learners should be taught how to use machinery and apply specific model making techniques. Learners should also be encouraged to use their initiative and creativity to find solutions to model making problems. Tutors should assist learners with critical evaluation and encourage learners to constantly evaluate their work. Photographic evidence of experimental or failed modelling attempts alongside high quality finished pieces should be recorded.

National Occupational Standards (NOS) mapping/signposting

NOS can be viewed on the relevant Sector Skills Council's website or the Occupational standards directory at www.ukstandards.co.uk.

Occupational standards	Unit number	Title
Engineering Technical Support Suite 2 2007	TS2-08	Checking Mechanical Components and Assemblies
Design	DES7	Contribute to the production of prototypes, models, mock-ups, artwork, samples or test pieces
Design	DES10	Create visual designs
Design	DES19	Develop and extend critical and creative thinking skills
Design	DES38	Manage design realisation
Design and Draughting	O15NDD07ECRS1.16	Generate and evaluate engineering design options
Design and Draughting	O15NDD08ECRS1.22	Develop design options
Design and Draughting	O15NDD09ECRS2.06	Communicating design options

Functional skills signposting

This section indicates where learners may have an opportunity to develop their functional skills.

Functional Skills Standards					
English		Mathematics		ICT	
Speaking and Listening		Representing		Use ICT systems	✓
Reading	✓	Analysing		Find and select information	
Writing		Interpreting		Develop, present and communicate information	

Resources

Equipment

For effective delivery of this unit centres should have access to the following resources and equipment.

- Computer system with Internet access, word processing, spread sheet, business presentation and photo manipulation software.
- 3D CAD software (optional)
- Projector or interactive white board for delivery of presentations.

- Photography equipment
- Document scanner.
- Model making equipment – sander, hot wire cutter, plastic sheet line bender, band saw, pillar drill. Hand tools – files, craft knives, sand paper, hand saw, hand drill, clay sculpting equipment, hot glue gun.
- Optional equipment – Milling machines, lathes, routers, vacuum forming machines, rapid prototyping equipment.
- Materials – e.g. cardboard of various thicknesses, modelling foam, MDF, hard and soft woods, aluminium sheet, steel bar and wire, plastic tubing, copper tubing, acrylic sheet, nuts, bolts and screws, a range of adhesives.

Additional information

For further information regarding administration for this qualification, please refer to the OCR document '*Admin Guide: Vocational Qualifications*' (A850) on the OCR website www.ocr.org.uk .