

# Unit 72: Scenic Construction for the Stage

<b>Unit code:</b>	<b>D/502/5670</b>
<b>QCF Level 3:</b>	<b>BTEC National</b>
<b>Credit value:</b>	<b>10</b>
<b>Guided learning hours:</b>	<b>60</b>

## ● Aim and purpose

This unit will develop learners' knowledge of set construction materials and techniques, through the exploration of materials, possible construction methods and possible set dressing finishes.

## ● Unit introduction

Scenic carpenters employ construction skills to build the sets for performance. They are 'magicians' using everyday construction materials such as timber, sheets of ply and lengths of steel to transform the stage to realise the designer's vision.

Set designers provide the scenic carpenter with a scale model box and/or scale construction drawings which should contain all of the relevant information to inform the building of the set. Learners will develop the ability to read and use scale, both in the model box and the construction drawings.

Building a set is a team effort which involves the designer, the scenic construction team, the stage manager and the production manager. Every set is individual and poses its own problems and the scenic carpenter plays a key role in problem solving with the designer and the set construction teams.

## ● Learning outcomes

**On completion of this unit a learner should:**

- 1 Know the properties of set construction materials
- 2 Know set construction techniques
- 3 Be able to apply materials and construction techniques
- 4 Be able to fulfil the role of set builder in a production team.

# Unit content

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## 1 Know the properties of set construction materials

*Explore the potential of set construction materials:* eg timber, sheet MDF, sheet ply, hardboard, canvas, steel, gauze

*Explore the potential of set decoration materials:* eg paint, wire, sheet metal, art roc, plastics, papier maché, leather, fabric

## 2 Know set construction techniques

*Explore the potential of joining methods:* eg frame construction, timber, steel, timber joints, nail, screws, bolts, welding, glues eg PVA, wood glue, copydex™, epoxy resin, solvents

*Explore set construction tools:* hand tools eg screwdriver, saws, hammers, mallet, staple gun, measuring tape, squares; portable power tools eg power drill, jig saw, circular saw, nail gun; bench-mounted tools eg mitre saw, chop saw, band saw, bench saw

## 3 Be able to apply materials and construction techniques

*Set construction materials:* eg timber, sheet MDF, sheet ply, hardboard, canvas, steel, gauze

*Set decoration materials:* eg paint, wire, sheet metal, art roc, plastics, papier maché, leather, fabric

*Joining methods:* eg frame construction, timber, steel, timber joints, nail, screws, bolts, welding, glues eg PVA, copydex™, epoxy resin, solvent glues

## 4 Be able to fulfil the role of set builder in a production team

*Use scale technical drawings to inform the building of scenic element(s):* use of 1:100, 1:50, 1:25, 1:10 scale drawings; set construction plans; elevations; resourcing of set construction materials

*Develop productive approach:* effective problem solving skills; effective two way interaction with the designer; productive relationship with the production team in production meetings; responsibility for the completion of the set; use of initiative to identify and solve potential problems; for assessment purposes keep an evaluative account of the process

*Health and safety:* for workshop spaces; complying with current directives; for performance spaces; use of tools; storage of equipment; storage of constructed scenery; manual handling; use of electricity; use of materials; for performers' health and safety on stage; levels; heights; stability of set; COSHH; PUWER

## 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:
<b>P1</b> describe the properties of set construction materials [IE]	<b>M1</b> explain the properties of set construction materials	<b>D1</b> analyse the properties of set construction materials
<b>P2</b> describe set construction techniques [IE, CT]	<b>M2</b> explain set construction techniques	<b>D2</b> analyse set construction techniques
<b>P3</b> demonstrate the use of scale drawings to produce work [CT, SM, EP]	<b>M3</b> demonstrate the use of scale drawings with competency to produce work with some accuracy	<b>D3</b> demonstrate the use of scale drawings with competence and confidence to produce detailed and accurate work
<b>P4</b> demonstrate basic techniques in set construction [SM, EP]	<b>M4</b> demonstrate a sound practical awareness of techniques in set construction	<b>D4</b> demonstrate a thorough practical application of techniques in set construction
<b>P5</b> construct a set or scenic element suitable for performance purposes with support and guidance [TW, SM, EP]	<b>M5</b> construct a set or scenic element suitable for performance purposes with minimum support and guidance	<b>D5</b> construct a set or scenic element suitable for performance purposes independently
<b>P6</b> apply appropriate health and safety procedures with guidance. [SM,EP,TW]	<b>M6</b> implement and manage appropriate health and safety procedures in most aspects of the production process.	<b>D6</b> consistently manage the thorough implementation of effective health and safety procedures.

**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.

<b>Key</b>	IE – independent enquirers CT – creative thinkers	RL – reflective learners TW – team workers	SM – self-managers EP – effective participators
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# Essential guidance for tutors

## Delivery

The delivery of this unit has two distinct phases.

Delivery should at first concentrate on the scenic construction methods, materials and safe use of tools through traditional classroom activities and exploratory workshops. This should provide a basis for an individual and experimental approach to develop learners' informed, confident and flexible approach. Assignments 1 and 2 cover assessment of this phase.

The second part of the unit concentrates on learners' individual application of scenic construction techniques and the use of materials to construct scenic elements that will be used in a performance.

This unit must also provide learners with the skills to interact successfully in all discussions and production meetings which involve the production of the scenic element. The scenic workshop is a high-risk area therefore all learners must understand and apply appropriate health and safety practice throughout this unit.

This unit will require a suitably resourced workshop or studio space that meets with current European health and safety directives.

## 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 unit, context and requirements of assessment: <ul style="list-style-type: none"><li>• rationale of the unit</li><li>• assignment requirements</li><li>• health and safety requirements.</li></ul>
Introduction to materials and their properties: <ul style="list-style-type: none"><li>• wood: soft and hard wood; standard sizes 2 x 2 – 2 x 1 – 3 x 2</li><li>• sheet ply wood: 6 mm, 9 mm, 12 mm, Class 1 fire resistant</li><li>• MDF: sizes 3-18 mm, issues of strength and flexibility.</li></ul>
Introduction to fixings and hand tools: <ul style="list-style-type: none"><li>• screw: cross head, straight cut, sizes in length and diameter and the relationship with drill bit sizes</li><li>• nails: tacks, serrated, ovals, sizes</li><li>• glue: PVA, Copydex™</li><li>• hand tools and how to use and maintain them: hammers, screwdrivers, bradawl, wood saws, scribes.</li></ul>
Use of power tools: <ul style="list-style-type: none"><li>• techniques: handling of power tools, safe use and storage, PPE, warnings and checks, additional health and safety – PUWER, PAT.</li></ul>

## Topic and suggested assignments/activities and/assessment

Research into job description and job availability of set construction worker/manager:

- job availability – who uses carpenters and set construction managers?
- job descriptions – what skills are required and what's the pay?

Techniques in constructing a basic frame:

- drawing plans, using scale, measuring
- choosing the wood, the fixings, the covering
- wood joints: lap joints, dove tails, screws, glue, bolts.

Building a flat:

- soft flats; cloth/gauze/scrim/canvas and wool
- hard flats; MDF/ply
- frame construction
- applying the covering
- presentation and neatness
- carrying and storage.

Stage bracing:

- different types and fixings, how they work
- battening: edge fixings to give stability
- make a basic stage brace: basic techniques applied in a small exercise.

### **Assignment 1: Set Construction in Theory and Techniques – P1, M1, D1, P2, M2, D2, P3, M3, D3, P4, M4, D4**

Set construction in the production process – learners will demonstrate their understanding of the techniques and materials of set construction during the production process using scale drawings or a model box (provided by tutor?) and work towards creating a basic piece of scenery such as a hard or soft flat.

Visit to scenery construction company or producing theatre (if possible).

Set decoration materials:

- paint – saturated, super saturated (Rosco paints), reaction to lighting
- wire, tying, shaping, covering include PPE (gloves, masks, overalls)
- plastics (moulded shapes such as castle walls, etc)
- papier maché, drying times, storage and cleaning of utensils.

Communication:

- working with designers, production meetings, the design brief
- progress reporting and problem solving.

Health and safety:

- manual handling: moving set pieces, loading and unloading into trucks, moving during scene changes, storage
- creating risk assessments, using a standard template, assess the risks in all activities and plan on how to minimise or avoid them
- COSHH, PAT, PUWER, LOLER (if using lifting equipment).

Tutorials:

- assess the learners' progress and set targets for progression to assess: progress in assignments and workshop knowledge.

## Topic and suggested assignments/activities and/assessment

### Assignment 2: Fulfil the Role of Set Builder in a Production – P5, M5, D5, P6, M6, D6

Learners will take on the formal role of set builder for a chosen production. Working from plans and/or a model box, learners will realise the scenic elements either individually or as a member of a larger team.

Learners will discuss the best use of materials, budget, timescale and the look of the finished product with the designer/director/choreographer/production and stage manager.

Feedback and grading.

## Assessment

The unit requires learners to demonstrate an understanding of the properties of various materials used in set construction along with the theory on how to apply skills in set construction. This is followed by an application of the skills as a test bed before moving on to carrying out the role of set construction as part of a production team working on a show.

The criteria are set out effectively in pairs and should potentially be applied in three separate assignments covering underpinning knowledge, practical demonstration and actual role and product.

Criterion 1 requires knowledge about the properties of set construction materials.

To achieve P1 learners will provide a list of appropriate materials (see unit content) describing the make up of those materials. The information will be at a basic level with answers such as canvas is a fabric type material that can be cut, folded or stretched or ply wood is made up of layers of wood glued together to give it strength for example. There will be no or little information on strength or durability or how to work the material.

To achieve M1 learners will explain the make up of the materials they choose including where it comes from, the differences in make up in relation to other materials and some indication of best application of the material. There will be an understanding of how to use the material correctly and safely for example MDF can only be used as a staging unit surface if the underneath is supported appropriately as it is quite a brittle material and would snap under a person's weight.

To achieve D1 learners would explain in detail the structural make up of materials with information about its strength and ease of use, making detailed comparisons with other materials. An example of this might be MDF has a smooth surface and is easy to cut, shape and paint making it a suitable material for surfaces or outlines and ply wood is made up of glued layered wood which gives it far greater strength, making it suitable for stage unit tops or items where weight will be applied. Information on the potential suitability for different applications will be included at this level.

Criterion 2 allows learners to demonstrate a theoretical understanding of set construction techniques.

To achieve P2 learners will identify a number of set construction techniques and how they are applied. There will be information on what to use and where for two or three applications. An example might be the use of 2" x 2" (50 mm x 50 mm) as a framing material for flattage or the use of canvas and serge to make a soft flat around a 3" x 2" (75 mm x 50 mm) wood frame. The method of fixing would be included but not in detail, eg glued together or nailed.

To achieve M2 more detail on how a material is fixed to another to achieve the result would be given.

The correct application of materials such as paint would be given including the primer undercoat with best methods of application suggested. Methods of fixing wood into frames or boxes would be described in more detail, eg screws should be used approximately 25 mm in from the edge of the wood ensuring that PVA glue has been applied.

To achieve D2 learners will explain why a method is used. Comparisons of different ways of doing the same job will be made with explanations of why and when each one would be used. This would include nailing versus screwing or staple versus glue, for example but would go into detail as to the reasons for each.

Criterion 3 is about using scale drawings to produce work. It is not a requirement to be able to produce scale drawings although this is obviously an asset.

To achieve a pass learners will be able to produce a basic piece of work from a scale drawing. A box or profiled piece of scenery which closely resembles the drawings would suffice at this level. There would be errors in accuracy and finish causing remedial work to correct the finished product. A lot of supervision and guidance would be given.

To achieve a merit learners would be able to produce a more complicated piece of set or scenery such as a box with an opening lid, a platform to stand on or a simple flat. The finished work would contain errors but not significant enough to prevent the work being used. Perhaps an almost finished look along with slight errors in measurement would be the result. Some guidance will be asked for and only occasional supervision required.

To achieve a distinction learners would confidently and competently produce accurate work from scale drawings. A number of elements may be produced but these criteria should only be awarded based on the accuracy of the transfer from drawings to product, not the number of products completed. Again, it is not about how complicated the drawings are but how accurately they have been interpreted. A simple box or silhouette such as a tree, as in pass criteria, would need to be part of a series of products perhaps with one or two flats produced as well.

Criterion 4 is about the practical demonstration of the theory demonstrated in criteria 1 and 2.

To achieve P4 learners will demonstrate one or two set construction techniques (see unit content) showing how they are applied. A basic piece of scenery or set may be produced dependent upon the existing skills and knowledge of learners otherwise some form of exercise should be devised that will allow a range of skills to be shown. Guidance will be given to enable learners to complete the exercise(s) and the need for more experience and research will be the result.

To achieve M4 learners will demonstrate three or more set construction techniques confidently with more than one way of applying them. Comparative ways of applying techniques would be demonstrated with a decision made on a preferred method, eg nailing two pieces of wood over screwing two pieces of wood to form a join. More detail and accuracy would be demonstrated and the appropriate and confident use of tools would be shown.

To achieve D4 learners will demonstrate a clear understanding of four or more set construction techniques and the competent the use of tools. Preferred methods of work will be explained and justified.

Criterion 5 is about learners' ability to demonstrate their mastery of the skills learned and their understanding of the relevant materials through their practical work.

To achieve a pass learners will produce one scenic element or one set element that is appropriate and usable in performance. Support and guidance will have been given without which the work would not have been produced.

To achieve a merit learners would produce set and scenic elements with the minimum of support and guidance. The work will be suitable for performance and would withstand the rigours of continuous use.

To achieve a distinction learners will produce set and scenery elements without support and guidance working with the relevant members of the production to provide a service as well as a product.

Criterion 6 is about the application of the relevant health and safety procedures and safe working practices.

To achieve pass learners will demonstrate a safe use of tools and equipment whilst carrying out work. A basic understating of the relevant health and safety practices (see unit content) will be demonstrated. Errors and lapses will be frequent hence some guidance will have been given.

To achieve merit learners will have created documentation such as a risk assessment and a method statement reflecting the work they are to carry out. They will be conversant with most of the areas of legislation but not all. Some guidance will have been given but mostly learners will demonstrate some autonomy. They will monitor their own and others' health and safety and discuss the work and the risks before starting.

To achieve distinction learners will be fully conversant with all the areas of legislation that relate to the work they are carrying out. They will produce appropriate documentation for scrutiny prior to commencing work and will not require any guidance during the process. Full management of health and safety will be demonstrated, perhaps through instructing others in the risks and how to avoid injury along with placement of signage and constant monitoring of the work space when in use.

Many interim formative assessment points will generate valuable evidence for assessment. This could include peer assessment from the production team, 1:1 tutor and learner tutorial.

The final summative assessment must be informed by the quality of materials, processes and finish of the final scenic elements.

Health and safety must be continuously assessed through practical demonstration and application. Additional evidence of learners' understanding of health and safety practice can be assessed through structured questioning in tutorials and/or through observation of working practice by questioning during the construction process.

### 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
P1, M1, D1, P2, M2, D2, P3, M3, D3, P4, M4, D4	Set Construction in Theory and Techniques	Research and demonstrate the underpinning knowledge required.	<ul style="list-style-type: none"><li>• Presentation, essay, Q&amp;A.</li><li>• Practical demonstration of techniques discussed.</li></ul>
P5, M5, D5, P6, M6, D6	Fulfil the Role of Set Builder in a Production	As part of the production process, carry out the role of set construction worker.	<ul style="list-style-type: none"><li>• Observation, notes from meetings, plans and drawings, question and answer, final product.</li></ul>

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

This unit forms part of the BTEC Performing and Production Arts sector suite. This unit has particular links with the following unit titles in the BTEC Performing and Production Arts suite:

Level 1	Level 2	Level 3
Exploring Technical Support for the Performing Arts	Set Construction	Production Arts Planning
	Performing Arts Production Process	Production for Theatre Performance
	Crewing for Stage Performance	Stage Design for Performance

This unit also has links with the following National Occupational Standards:

Technical Theatre

- CPD1 – Improving your skills
- CPD2a – TP Keeping up to date with technical and production developments in the live arts
- CPD4a – Contributing to technical production work for performance
- HS1 – Working safely
- TP2.5a – Contribute to the interpretation of designs for sets or props
- TP2.5b – Interpreting designs for sets or props
- TP3.5b – Planning set construction requirements for a production
- TP6a – Producing scenic works
- TP7.3a – Making and finishing sets.

### Essential resources

A well-equipped workshop space that meets current health and safety guidelines is essential for effective completion of this unit. Learners will require access to a range of scenic construction materials, hand and power tools. Fixed workshop equipment is not essential but provision should be made for learners to familiarise themselves with such equipment and if possible undergo training in its use. Space needs to be provided for the construction of large scenic elements. Basic studio resources will be required for the completion of planning, research and technical drawing work.

Access to a local producing theatre or set construction company would be advantageous.

### Employer engagement and vocational contexts

Visits to set construction workshops and/or from professionals would benefit learners. Work placements would provide experience and evidence towards assessment.

## Indicative reading for learners

### Textbooks

Blurton J – *Scenery: Draughting and Constructing* (A & C Black, 2001) ISBN 9780713656848

Carter P – *Backstage Handbook: An Illustrated Almanac of Technical Information* (Broadway Press, 1994) ISBN 9780911747393

Gillette A and Gillette J – *Stage Scenery: Its Construction and Rigging* (Longman, 1981) ISBN 9780060423322

Gillette J M – *Theatrical Design and Production: An Introduction to Scene Design and Construction, Lighting, Sound, Costume, and Makeup* (McGraw Hill, 1999) ISBN 9780767411912

Ionazzi D A – *The Stagecraft Handbook* (North Light Books, 2001) ISBN 9781558704046

Sammler B and Harvey D – *Technical Design Solutions for Theatre* (Focal Press, 2002) ISBN 9780240804903

### Journal

*Sightline* (ABTT Subscription)

### Websites

[www.4rfv.co.uk](http://www.4rfv.co.uk)

Directory of theatre equipment-related businesses

[www.ccskills.org.uk](http://www.ccskills.org.uk)

Creative and Cultural skills

## 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 ...
<b>Independent enquirers</b>	researching for suitable materials to use. Asking questions about plans/designs/requirements
<b>Creative thinkers</b>	choosing appropriate materials
<b>Reflective learners</b>	relating to previous work/units
<b>Team workers</b>	constructing set pieces as part of a group
<b>Self-managers</b>	creating construction schedules
<b>Effective participators</b>	contributing to meetings and briefing sessions.

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 ...
<b>Independent enquirers</b>	seeking additional information to support existing knowledge
<b>Creative thinkers</b>	solving a problem with design/measurement/construction of set pieces
<b>Reflective learners</b>	looking at others' work with a view to improvement
<b>Team workers</b>	contributing to a group project/exercise
<b>Self-managers</b>	organising logistics/facilities without supervision or prompt
<b>Effective participators</b>	getting involved in load in and fit up/get out.

## ● Functional Skills – Level 2

Skill	When learners are ...
<b>ICT – Use ICT systems</b>	
Select, interact with and use ICT systems independently for a complex task to meet a variety of needs	using a CAD system to read/create plans
Use ICT to effectively plan work and evaluate the effectiveness of the ICT system they have used	using a project based software to organise time and resources
Manage information storage to enable efficient retrieval	using a database of materials or providers of services
<b>ICT – Find and select information</b>	
Access, search for, select and use ICT-based information and evaluate its fitness for purpose	researching materials and resources
<b>ICT – Develop, present and communicate information</b>	
Enter, develop and format information independently to suit its meaning and purpose including: <ul style="list-style-type: none"> <li>• text and tables</li> <li>• images</li> <li>• numbers</li> <li>• records</li> </ul>	using a spreadsheet to calculate budgets working with pictures of design ideas
Bring together information to suit content and purpose	working with CAD/drawings and scale information to arrive at a conclusion
Select and use ICT to communicate and exchange information safely, responsibly and effectively including storage of messages and contact lists	emailing information to designer/director regarding set design
<b>Mathematics</b>	
Understand routine and non-routine problems in a wide range of familiar and unfamiliar contexts and situations	converting scale to actual size
Identify the situation or problem and the mathematical methods needed to tackle it	relating set size to stage size for construction purposes and making relevant amendments
Use appropriate checking procedures and evaluate their effectiveness at each stage	confirming scale conversions to actual size
Interpret and communicate solutions to practical problems in familiar and unfamiliar routine contexts and situations	solving problems with set construction design by amending size/scale/measurements

Skill	When learners are ...
<b>English</b>	
Speaking and listening – make a range of contributions to discussions and make effective presentations in a wide range of contexts	contributing to design meetings/presenting ideas on construction methods and materials
Reading – compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions	reviewing information regarding requirements of set construction elements.