

# Unit 18: Developing Plumbing Skills

**Unit reference number:** K/502/3694

**QCF level:** 1

**Credit value:** 4

**Guided learning hours:** 40

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## Unit aim

This unit introduces learners to the hand tools, materials and personal protective equipment (PPE) used in plumbing. The unit offers learners opportunities to develop the skills needed to perform basic plumbing operations.

## Unit introduction

Emphasis is placed on the correct selection and safe use of the appropriate tools and equipment required to carry out basic plumbing processes.

Learners will be given the opportunity to practise the plumbing techniques used to connect copper tubes and to install hot and cold taps and a tubular swivel trap to a sink. Learners will use these techniques to construct a pipe rig and a functioning sink.

Although learners will work independently when performing plumbing operations, they will also function as effective members of a team by contributing to the maintenance of a clean and tidy workshop, and by working responsibly with others.

When preparing for work in plumbing it is important that learners are able to seek and respond to guidance from colleagues and teachers during the learning process. This unit will help learners to develop an understanding of the personal qualities that are valued by employers.

It is recommended that learners will either have successfully completed unit 10 *Health and Safety and Welfare in Construction* before starting this unit, or that they will be studying the unit alongside this one, using an integrated delivery and assessment approach.

## Essential resources

Learners will require access to workbenches, hand tools and materials of a nature and standard typical of a proper work environment. The learning environment must be a safe place of work to carry out the mechanical plumbing tasks, with appropriate work areas and storage for tools, equipment and PPE.

Learners will also require access to a technical library with current textbooks on construction and the built environment and building services. Internet access will give learners an opportunity to develop skills in e-learning but the tutor will need to manage this carefully.

## Learning outcomes, assessment criteria and unit amplification

To pass this unit, the learner needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria determine the standard required to achieve the unit.

Learning outcomes		Assessment criteria		Unit amplification
1	Know the hand tools used in basic plumbing processes	1.1	List and describe appropriate hand tools to be used in basic plumbing processes	<ul style="list-style-type: none"> <li>□ <i>Hand tools:</i> e.g. hacksaw, wheelcutter, file, wire wool, wrench, grips, spanner, bending spring, blowtorch</li> </ul>
		2.1	List and describe appropriate materials to be used in basic plumbing processes	
2	Know the materials and components used in basic plumbing processes	2.1	List and describe appropriate materials to be used in basic plumbing processes	<ul style="list-style-type: none"> <li>□ <i>Materials:</i> copper pipe; PVC tubing, jointing paste, flux</li> </ul>
		2.2	List and describe appropriate components to be used in basic plumbing processes	
3	Know the personal protective equipment (PPE) used in basic plumbing processes	3.1	List and describe appropriate PPE to be used in basic plumbing processes	<ul style="list-style-type: none"> <li>□ <i>Personal protective equipment:</i> safety gloves; goggles; safety boots/shoes; other PPE as appropriate</li> <li>□ <i>Basic plumbing processes:</i> forming capillary joints, forming compression joints; bending copper pipe; connecting taps and traps</li> </ul>
		4.1	Select and use hand tools safely to connect copper tubes	
4	Be able to apply safe working practices to perform plumbing operations	4.1	Select and use hand tools safely to connect copper tubes	<ul style="list-style-type: none"> <li>□ <i>Safe working practices:</i> compliance with advice and guidance given; safe maintenance, use and storage of tools and equipment</li> </ul>
		4.2	Select and use hand tools safely to install a functioning sink	

Learning outcomes		Assessment criteria		Unit amplification
5	Be able to work responsibly with others	5.1	Maintain a clean and tidy work environment	<ul style="list-style-type: none"> <li>□ <i>Behaviour:</i> e.g. responsibility, recognition of strengths and skills of self and other team members, cooperation, tidying 'as you go'</li> </ul>
		5.2	Work responsibly in the workshop	
6	Be able to seek and respond to guidance when working as part of a team	6.1	Follow instructions when working with others	<ul style="list-style-type: none"> <li>□ <i>Attitudes:</i> e.g. enthusiasm; approachability; communication skills, e.g. listening, questioning, speaking clearly; following instructions</li> </ul>
		6.2	Communicate appropriately with others	

## Information for tutors

### Delivery

This unit will give learners their first experience of the practical skills associated with plumbing, together with the knowledge required to underpin such practical skills. Learners must be given opportunities to develop their knowledge and practical skills through supervised practical workshop activities, group teaching and demonstrations of the tools, equipment, materials, techniques and PPE involved.

Learners and tutors are encouraged to view the unit as a 'taster', in that it gives the learner an opportunity to experience the type of work involved in plumbing.

All building services craft tasks are problems to be solved (often in three dimensions) with available tools and materials and within a given timescale. The solutions to the problems are the conventional techniques, methods and procedures that building services craftspeople have developed to address the work they face on a daily basis. The learner will need to discuss the materials, components, tools, equipment, PPE and techniques to be used with a responsible and competent person and should respond positively to any advice given. They should then select the tools, equipment, materials, components and PPE appropriate for the task in hand, and use these to perform the specified plumbing tasks.

### Outline learning plan

The outline learning plan has been included in this unit as guidance.

Topic and suggested assignments/activities
Know the hand tools used in basic plumbing processes. Whole-class, tutor-led discussion about hand tools. Individual work on tool identification sheets. Requisitioning tools from tools store.
Know the materials and components used in basic plumbing processes. Site visit. Presentation from qualified working plumber. Trip to plumbers' merchant.
Know the personal protective equipment (PPE) used in basic plumbing processes. Whole-class, tutor-led discussion about PPE, when and where it is necessary and how it works. Individual work on PPE identification sheets. Learners complete requisition sheets to obtain PPE from store. Learners given opportunities to select and wear the full range of the PPE used in plumbing.
Practise the processes used to perform basic plumbing processes. Practical demonstration of how to keep work areas tidy. The hand-to-eye motor skills associated with plumbing are best taught by the tutor demonstrating the skills required, followed by the learners practising the skills. The tutor should monitor learners as they practise their skills and provide guidance, advice, correction or praise as appropriate.
Be able to apply safe working practices to perform plumbing operations. Assessment—two hours for learners to demonstrate knowledge of the hand tools, materials and PPE to be used in the practical assessment tasks. Evidence of selection or deselection of each required. This can be achieved by completion of in-house requisition forms or similar. Four hours to demonstrate use of safe working practices to perform basic plumbing operations.

## Topic and suggested assignments/activities

Be able to work responsibly with others.

Use of health and safety videos/DVDs to demonstrate the dangers of a dirty and untidy workplace. Discussion of important role played by on-site personnel behaving in a cooperative and responsible manner. Constant encouragement from tutors to 'tidy as you go' during practical plumbing sessions.

Be able to seek and respond to guidance when working as part of a team.

Tutors should encourage learners to ask questions about their work. This could be prompted by tutors asking learners to explain what they are doing, and why they are doing it, or to name a tool or an item of PPE as they work. Learners should be aware that their attitude, and the nature of their responses to any advice provided, will comprise part of the evidence required to achieve the unit. This requires no formal allocation of time and should occur during practice and assessment.

## Assessment

Achievement of assessment criteria should be evidenced through contextualised, vocationally related practical experiences with tasks specifically designed with the assessment criteria in mind. Many of the assessment criteria will need to be assessed directly by the tutor during practical activities. Where this approach is used, suitable evidence from guided activities would require observation records and/or witness statements.

The use of two assessment instruments is suggested to allow full coverage of the learning outcomes. The first assessment instrument would comprise 1.1, 2.1 and 3.1 and should focus on the correct selection of the tools, materials and PPE required to complete the plumbing tasks and the reason why each is appropriate. The second assessment instrument would comprise 4.1, 5.1, 5.2, 6.1 and 6.2 and should focus on the completion of the practical plumbing tasks.

For 1.1, learners must list and describe commonly used hand tools. This will be evidenced most clearly by completion of appropriate requisition orders.

For 2.1 and 2.2, learners must list and describe the correct materials and components to be used to complete the plumbing tasks. This will be evidenced most clearly by completion of appropriate requisition orders.

For 3.1, learners must list and describe the appropriate PPE to be worn or used when performing plumbing tasks. This will be evidenced most clearly by completion of appropriate requisition orders.

For 4.1 and 4.2, learners must be able to use the selected tools, materials, components and PPE to perform plumbing tasks. Learners must be aware of the need for joints to be watertight and pipes to run horizontally or vertically, but there are no specified tolerances at this level. It is anticipated that considerable guidance will be given to learners. Photographs, observation records and witness statements could be provided as evidence. Learners need to follow safe working practices.

For 5.1 and 5.2, learners must maintain a clean and tidy workspace and work responsibly with others. The learners should be aware of any hazards associated with the practical tasks they perform but they need not produce risk assessments or suggest control measures. The evidence could take the form of a witness statement.

For 6.1 and 6.2, learners must demonstrate responsibility by seeking and listening to guidance and clarification from tutors as and when appropriate, and by acting upon the guidance received. They should communicate appropriately with both

tutors and other learners at all times. The evidence could take the form of a witness statement.

## **Suggested resources**

### **Books**

*Basic Plumbing: Pro Tips and Simple Steps* (Meredith Corporation, 2002)  
ISBN 0696213206

Greeno R and Hall F – *Building Services Handbook, 5th Edition* (Butterworth-Heinemann, 2009) ISBN 9781856176262

Topliss S and Murray-Smith J – *BTEC Entry 3/Level 1 Construction Student Book* (Pearson, 2010) ISBN 9781846909207

Treloar R D – *Plumbing: Heating and Gas Installations, 3rd Edition* (Wiley-Blackwell, 2006) ISBN 9781405139625

### **Websites**

[www.cibse.org](http://www.cibse.org)

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

[www.hse.gov.uk](http://www.hse.gov.uk)

[www.householdersguide.com](http://www.householdersguide.com)

[www.iosh.co.uk](http://www.iosh.co.uk)

[www.rospa.co.uk](http://www.rospa.co.uk)

[www.theplumber.com](http://www.theplumber.com)