Technical and Vocational Education and Training (TVET) Council

Occupational Standards of Competence

Mechanical Engineering Drawing

Level 1

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ACKNOWLEDGEMENTS

The Technical and Vocational Education and Training Council thanks the following for their contribution to the development of this document.

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Qualification Overview

NVQB

in

Mechanical Engineering Drawing

Level 1

Qualification Overview

This qualification is designed to provide guidance, training, assessment and certification in engineering drafting. It is intended for training providers, employers and all persons involved in engineering drafting in the mechanical engineering service industry. It involves teaching, demonstrating routines and working with the engineering team to execute work activities and projects. It includes competencies in occupational health and safety for personal development which can be achieved through managing self and working with relevant others in engineering teams. The standard also includes competencies in the use of manual drafting methods and Computer Aided Design (CAD), technology, equipment and software from specifications, layouts, sketches to aid and assist learners in the training programme.

Who is this qualification for?

The qualification is designed for persons who work in areas of mechanical engineering and drafting in the engineering sector.

Jobs in the occupational sector

- Draughtsman
- Engineering assistant

This list is not exhaustive and only serves to illustrate the breadth of the qualification.

A09901 APPROVED NATIONAL VOCATIONAL QUALIFICATION STRUCTURE

MECHANICAL ENGINEERING DRAWING LEVEL 1

To achieve the full qualification, candidates must complete all **TEN (10)** mandatory units.

MANDATORY UNITS (ALL MUST BE COMPLETED)	CODES
1. Use measurements and perform calculations	**UA36401**
1.1 Plan and prepare for measuring and calculating	
1.2 Obtain measurements	
1.3 Perform simple calculations	
1.4 Estimate approximate quantities	
2. Plan and organise work	**UA11302**
2.1 Identify work requirements	
2.2 Plan steps to complete work	
2.3 Organise work	
2.4 Review planning and organising process	
3. Draw and interpret sketches and simple drawings	**U50402**
3.1 Prepare for drawing	
3.2 Draw geometric constructions	
3.3 Construct multi-view (orthographic 2D) drawings	
3.4 Develop pictorial (3D) drawings	
3.5 Construct and dimension drawings	
3.6 Apply notes and leaders	
4. Apply basic communication skills	**UA36501**
4.1 Identify workplace communication procedures	
4.2 Communicate in the workplace	
4.3 Draft written information	
5. Carry out occupational health and safety requirements	**UA36601**
5.1 Plan and prepare for safe work practices	
5.2 Use safe work practices to carry out work	
5.3 Assume responsibility for the safety of self and others	
5.4 Work from ladder and work platforms	
5.5 Use electrical power supply	
5.6 Adhere to emergency procedures	
5.7 Carry out general housekeeping	

MANDATORY UNITS (ALL MUST BE COMPLETED)	CODES
6. Perform basic computations	**UA36701**
6.1 Determine work requirements	
6.2 Perform calculations	
6.3 Produce charts and graphs from given information	
7. Prepare engineering drawings	**UA36801**
7.1 Prepare to produce engineering drawings	
7.2 Produce engineering drawings	
7.3 Complete engineering drawings	
8. Prepare 2D drawings using computer aided design (CAD) systems	**UA36901**
8.1 Prepare the CAD environment	
8.2 Prepare dimensional drawings	
9. Produce freehand sketches	**UA37001**
9.1 Determine sketch requirements	
9.2 Create simple sketches of pictorial, orthographic and sectional views	
9.3 Produce sketches of geometric shaped objects	
9.4 Produce pictorial sketches of engineering components	
10. Contribute to the protection of the environment	**U68402**
10.1 Work in an environmentally conscious way	
10.2 Contribute to continuous improvements in protecting the environment	

UA36401 **Use measurements and perform calculations**

Unit Descriptor:

This unit deals with the knowledge, skills and attitudes required to effectively use measurements and perform calculations of work to the required tolerance. It applies to all individuals working in the mechanical engineering industry.

ELEMENT	PERFORMANCE CRITERIA
To be competent you must achieve the following:	
1. Plan and prepare for measuring and calculating	1.1 Confirm and apply work instructions using relevant **information**.
	1.2 Obtain and apply safety requirements from the site safety plan, other regulatory specifications or legal obligations.
	1.3 Select measuring and calculating **equipment** to carry out tasks consistent with the requirements of the job.
2. Obtain measurements	2.1 Select and apply methods of obtaining the measurement according to organisational requirements.
	2.2 Obtain accurate measurements for **job instructions** using rule, tape and other measuring devices.
	2.3 Confirm and record measurements according to work instructions and organisational requirements.
3. Perform simple calculations	3.1 Carry out simple **calculations** involving length, perimeter, mass and volume using the four basic operations (+, -, x, ÷),
	3.2 Calculate material quantities for the project correctly using the appropriate factors.
	3.3 Confirm and record results according to **job instructions** and organisational procedures.
4. Estimate approximate quantities	4.1 Estimate approximate measurements or quantities on site or from **job instructions**.

4.2 Obtain information correctly from **job instructions** according to organisational procedures.

4.3 Identify and record measurements correctly according to **job instructions** and organisational requirements.

4.4 Calculate and record quantities of materials suitable for work undertaken according to **job instructions**.

4.5 Estimate costs for a **simple project** to within + or – 10% according to **job instructions**.

RANGE STATEMENT

All range statements must be assessed:

1. **Information:**

    - Verbal
    - Written
    - Graphical

2. **Equipment:**

    - Calculators
    - Laser equipment
    - Tape measures
    - Rulers

3. **Calculations:**

    - Perimeter
    - Area
    - Volume
    - Mass
    - Scales
    - Ratios

4. **Job instructions:**

    - Verbal direction/instruction
    - Written instruction
    - Drawing and details

5. **Simple projects:**

    - Structural steel works
    - Sheeting or panelling works

UNDERPINNING KNOWLEDGE AND SKILLS

You need to know and understand:

1. What is the importance of drawings and specifications.
2. What materials are relevant to the mechanical engineering process.
3. What are the basic operations in simple geometry, measurement and calculations.
4. What are the costing procedures relative to the mechanical engineering process.
5. What are the units of measurement and conversion factors.
6. How to read and interpret drawings.
7. How to measure and calculate manually.
8. How to record measurements correctly.
9. How to measure accurately.
10. How to operate electronic calculating devices.
11. How to communicate effectively.

EVIDENCE GUIDE

For assessment purposes:

(1) Critical Aspects of Evidence

Candidates must prove that they can carry out **all** of the elements, meeting **all** the performance criteria, range and underpinning knowledge **on more than one occasion**. This evidence must come from a real working environment.

(2) Method of Assessment

Assessors should gather a range of evidence that is valid, sufficient, current and authentic.

Evidence may be collected in a variety of ways including:

- Observation
- Written/oral questioning
- Written evidence
- Graphical

Questioning techniques should not require language, literacy or numeracy skills beyond those required in this unit of competency.

(3) Context of Assessment

This unit may be assessed on the job, off the job or a combination of both. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by a candidate working alone or as part of a team. The assessment environment should not disadvantage the candidate.

The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

Simulation **may be used**, except in exceptional circumstances where natural work evidence is unlikely to occur.

UA11302 Plan and organise work

Unit Descriptor:

This unit of competency covers the knowledge, skills and attitudes required to plan and organise individual and group work. It includes identifying work requirements, planning steps and organising work.

ELEMENT	PERFORMANCE CRITERIA
To be competent you must achieve the following:	
1. Identify work requirements	1.1 Check and confirm work requirements to ensure correct interpretation of specifications or requirements.
	1.2 Follow safety requirements in accordance with safety plans and policies.
	1.3 Identify and implement signage and barricade requirements.
2. Plan steps to complete work	2.1 Interpret task and identify the relevant steps to ensure efficient conduct of work, in accordance with **occupation safety and health (OSH) environmental** and **quality requirements.**
	2.2 Identify work and major processes and sequences organised to achieve effective completion of work.
	2.3 Plan steps in conjunction with others.
3. Organise work	3.1 Organise work activity with other involved personnel to ensure safe and appropriate sequencing of tasks.
	3.2 Complete and record all necessary documentation related to the job planning progress in accordance with procedures.
4. Review planning and organising process	4.1 Review planning activities to establish the effectiveness of the process.
	4.2 Suggest and implement ideas for improvement in future planning and organising of work activities.

RANGE STATEMENT

All range statements must be assessed:

1. **Occupational safety and health:**

    - Emergency procedures
    - Handling of materials
    - Hazard control
    - Hazardous materials and substances
    - Safe operating procedures
    - First aid
    - Personal protective equipment
    - Workplace environment and safety

2. **Environmental requirements:**

    - Noise and dust
    - Vibration
    - Clean up and waste management
    - Lighting

3. **Quality requirements:**

    - Internal organisational policy and standard operating procedures
    - Manufacturers' specifications

UNDERPINNING KNOWLEDGE AND SKILLS

You need to know and understand:

1. What are the work activities that need to be planned.
2. What are the work safety, environmental and quality requirements for the assigned activity.
3. Which workplace personnel should be involved in planning and organising task.
4. What are the organisation's reporting documents and procedures.
5. How to communicate effectively.
6. How to determine and confirm task requirements.
7. How to plan and organise work activities with others.
8. How to complete workplace documentation.
9. How to interpret work specifications.
10. How to work in a culturally diverse environment.
11. How to use relevant technology.

EVIDENCE GUIDE

For assessment purposes:

(1) Critical Aspects of Evidence

Candidates must prove that they can carry out **all** of the elements, meeting **all** the performance criteria, range and underpinning knowledge **on more than one occasion**. This evidence must come from a real working environment.

(2) Method of Assessment

Assessors should gather a range of evidence that is valid, sufficient, current and authentic.

Evidence may be collected in a variety of ways including:

- Observation
- Written/oral questioning
- Written evidence
- Witness testimony

Questioning techniques should not require language, literacy or numeracy skills beyond those required in this unit of competency.

(3) Context of Assessment

This unit may be assessed on the job, off the job or a combination of both. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by a candidate working alone or as part of a team. The assessment environment should not disadvantage the candidate.

The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

Simulation **should not be used**, except in exceptional circumstances where natural work evidence is unlikely to occur.

U50402 Draw and interpret sketches and simple drawings

Unit Descriptor:

This unit of competency covers the knowledge, skills and attitudes required to effectively draw and interpret simple layout drawings and sketches.

ELEMENT	PERFORMANCE CRITERIA
To be competent you must achieve the following:	
1. Prepare for drawing	1.1 Identify and select **drawing instruments** and supplies.
	1.2 Identify and apply **alphabet of lines** with all lines distinct, easily read and of the appropriate line weight and type.
	1.3 Perform measurements using appropriate **scales**.
	1.4 Construct lettering distinctly and in a legible manner.
2. Draw geometric constructions	2.1 Complete drawings to illustrate a series of **geometric constructions**, shapes and activities.
	2.2 Complete drawings in a neat manner and clear of smudges and in accordance with industry standards.
3. Construct multi-view (orthographic 2D) drawings	3.1 Layout drawings to illustrate three views of specified object with correct line representation.
	3.2 Complete **multi-view drawing (orthographic 2 dimensional)** according to industry standards.
4. Develop pictorial (3D) drawings	4.1 Construct drawing using the correct view orientation (isometric).
	4.2 Complete **pictorial (3 dimensional) drawing** with hidden features.
5. Construct and dimension drawings	5.1 **Complete dimensions** to all major features on the drawing according to specifications.

	5.2 Show all necessary details and information.
6. Apply notes and leaders	6.1 Label finished drawing neatly and appropriately in accordance with industry standards.

RANGE STATEMENT

All range statements must be assessed:

1. **Drawing instruments:**

    - Drafting kit
    - Workstation
    - Drafting paper
    - Drawings
    - Photographs

2. **Alphabet of lines**:

    - Object line
    - Hidden line
    - Centre line
    - Section line
    - Dimension line
    - Extension line
    - Cutting plane
    - Break line
    - Phantom line

3. **Scales**:

    - Metric/imperial
    - Engineering

4. **Geometric constructions:**

    - Circles
    - Inscribe, circumscribe and escribe
    - Triangles with specified angles
    - Polygons
    - Ellipse
    - Arcs thru three points
    - Tangent to two circles

5. **Multi-view drawing (orthographic 2 Dimensional):**

    - Full scale orthographic 3-view drawing, third angle projection with top, front and side view showing all hidden features

6. Pictorial (3 Dimensional) drawings:

- Full scale basic isometric drawing
- Isometric corner with left and right side lines each 30 degrees up from horizontal and third line at a vertical, with all three lines joining in a common intersection
- One and two-point perspective drawings
- Oblique drawings

UNDERPINNING KNOWLEDGE AND SKILLS

You need to know and understand:

1. What are the types and uses of drawing instruments and supplies.
2. How to identify the alphabet of lines, line type variation, order of usage and application on drawings.
3. What are the types of scale and proportion and how these are used for measurement.
4. What are the symbols, dimension and terminology associated with drawings.
5. What are the types of drawings and their applications.
6 How to prepare 3 dimensional/pictorial drawings.
7. How to make simple freehand sketches.
8. How to prepare technical drawings with drawing instruments.
9. How to read and interpret sketches and working drawings.
10. How to measure accurately.
11. How to communicate effectively.

EVIDENCE GUIDE

For assessment purposes:

(1) Critical Aspects of Evidence

Candidates must prove that they can carry out **all** of the elements, meeting **all** the performance criteria, range and underpinning knowledge **on more than one occasion**. This evidence must come from a real working environment.

(2) Method of Assessment

Assessors should gather a range of evidence that is valid, sufficient, current and authentic.

Evidence may be collected in a variety of ways including the following:

- Observation
- Written/oral questioning
- Written evidence
- Witness testimony
- Graphical

Questioning techniques should not require language, literacy or numeracy skills beyond those required in this unit of competency.

(3) Context of Assessment

This unit may be assessed on the job, off the job or a combination of both. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by a candidate working alone or as part of a team. The assessment environment should not disadvantage the candidate.

The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

Simulation **should not be used**, except in exceptional circumstances where natural work evidence is unlikely to occur.

UA36501 Apply basic communication skills

Unit Descriptor:

This unit covers the knowledge, skills and attitudes required to develop communication skills in the workplace. It covers gathering, conveying and receiving information, along with completing assigned written information under direct supervision.

ELEMENT	PERFORMANCE CRITERIA
To be competent you must achieve the following:	
1. Identify workplace communication procedures	1.1 Identify organisational communication requirements and **workplace procedures** with assistance from **appropriate persons**.
	1.2 Identify appropriate **lines of communication** with supervisors and colleagues.
	1.3 Seek advice on the **communication method and equipment** most appropriate for the task.
2. Communicate in the workplace	2.1 Use effective questioning and active listening and speaking skills to gather and convey information.
	2.2 Use appropriate non-verbal behaviour at all times in accordance with organisational procedures.
	2.3 Encourage, acknowledge and act upon constructive feedback in accordance with organisational requirements.
3. Draft written information	3.1 Identify relevant procedures and formats for written information in accordance with organisational procedures.
	3.2 Draft and present assigned **written information** for approval, ensuring it is written clearly and concisely within designated timeframes according to organisational guidelines.
	3.3 Confirm that written information meets organisational **standards** of style, format and detail.

3.4 Seek assistance and/or feedback to aid communication skills development.

RANGE STATEMENT

All range statements must be assessed:

1. **Workplace procedures:**

   - Answering telephone calls
   - Following instructions
   - Informal discussions
   - Responding to requests from colleagues
   - Using internet and email

2. **Appropriate persons:**

   - Colleagues
   - Supervisors
   - Mentors
   - Trainers

3. **Lines of communication:**

   - Formal or informal
   - Written or verbal

4. **Communication method and equipment:**

   - Computer network systems
   - Personal computer systems
   - Telephones

5. **Written information:**

   - Email
   - General correspondence
   - Hand written and printed materials
   - Telephone messages and general messages

6. **Standards:**

   - Organisational policies
   - Industry/sector regulations

UNDERPINNING KNOWLEDGE AND SKILLS

You need to know and understand:

1. What are the organisational plans, policies and procedures.
2. What are the standard operating procedures relative to communication.
3. What are the different lines of communication that can be used in the workplace.
4. What are the organisational formats and procedures for drafting written information.
5. How to and from whom to request advice.
6. How to convey messages clearly and concisely.
7. How to identify work requirements.
8. How to draft written information.
9. How to process basic workplace documentation.
10. How to solve routine problems related to the workplace.

EVIDENCE GUIDE

For assessment purposes:

(1) Critical Aspects of Evidence

Candidates must prove that they can carry out **all** of the elements, meeting **all** the performance criteria, range and underpinning knowledge **on more than one occasion**. This evidence must come from a real working environment.

(2) Methods of Assessment

Assessors should gather a range of evidence that is valid, sufficient, current and authentic.

Evidence may be collected in a variety of ways including:

- Observation
- Written/oral questioning
- Written evidence
- Witness testimony
- Professional discussion

Questioning techniques should not require language, literacy or numeracy skills beyond those required in this unit of competency.

(3) Context of Assessment

This unit may be assessed on the job, off the job or a combination of both. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by a candidate working alone or as part of a team. The assessment environment should not disadvantage the candidate.

The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

Simulation **should not be used**, except in exceptional circumstances where natural work evidence is unlikely to occur.

UA36601 Carry out occupational safety and health requirements

Unit Descriptor:

This unit covers the knowledge, skills and attitudes required to effectively perform work activities to conform to occupational health and safety requirements and applies to all individuals working in the mechanical engineering industry.

ELEMENT	PERFORMANCE CRITERIA

To be competent you must achieve the following:

1. Plan and prepare for safe work practices	1.1 Identify and adhere to the **quality assurance requirements** associated with organisational safety operations.
	1.2 Select, correctly fit and make appropriate **personal protective equipment** ready for use according to organisational and industry health and safety guidelines.
	1.3 Select tools and equipment consistent with the safe work practice requirements of the job, check for serviceability and report any faults to the supervisor.
	1.4 Erect appropriate barricades, hoardings and signage where applicable, at required job locations according to organisational and industry health and safety requirements.
2. Use safe work practices to carry out work	2.1 Carry out work safely and in accordance with the statutory regulations and policies for occupational safety and health.
	2.2 Identify safety hazards and workplace accidents and incidents in the course of work and report to appropriate persons in accordance with organisational policy.
	2.3 Apply industry and site **safety responsibilities** according to organisational and industry health and safety requirements.

		2.4 Select and operate firefighting equipment according to the type of fire and fire safety guidelines.
		2.5 Follow current site emergency and first-aid procedures according to organisational health and safety requirements.
		2.6 Acknowledge and adhere to signals/sirens for blasting operations according to organisational and industry health and safety procedures.
3.	Assume responsibility for the safety of self and others	3.1 Follow health and safety manual handling techniques and guidelines for lifting and placing.
		3.2 Follow manufacturer's and organisational safety procedures for pre-use checks and the operation of specified power tools/plant, machinery and equipment.
		3.3 Follow recommended industry and organisational health and safety safe practices in handling chemical and potentially hazardous materials.
		3.4 Confirm that ladders and work platforms are erected safely in planned locations and are constructed from durable materials.
4.	Work from ladder and work platforms	4.1 Take care to avoid overhead power lines and other obstructions according to organisational and industry health and safety requirements.
		4.2 Confirm that the head and base of the ladder or work platform is secure and supported against accidental movement.
		4.3 Perform work safely from ladder and work platforms according to industry and organisational health and safety requirements.
		4.4 Use appropriate fall arrest equipment i.e. safety harness in accordance with current industry occupational safety and health guidelines.

5.	Use electrical power supply	5.1 Locate the position of power poles/boxes for safe placement of leads.
		5.2 Position the framework support to keep leads at the correct height and prevent hazards.
		5.3 Visually check the power board and surrounding area for damage, water entry and stability.
		5.4 Check leads for tags and visual damage and earth leakage protection for serviceability.
		5.5 Confirm that work is carried out safely when using an electrical power supply in accordance with organisational and industry requirements.
6.	Adhere to emergency procedures	6.1 Locate and use available **emergency equipment** as required in accordance with organisational procedures and manufacturer's specifications.
		6.2 Adhere to current worksite and organisational emergency and evacuation procedures.
7.	Carry out general housekeeping	7.1 Dispose of waste material safely in accordance with requirements of site and regulatory environmental legislation.
		7.2 Clean, maintain and store unused equipment and materials safely and in accordance with organisational procedures and manufacturer's instructions.
		7.3 Observe the occupational health and safety requirements of the site and industry regulatory bodies

RANGE STATEMENT

All range statements must be assessed:

1. **Quality assurance requirements:**

    - Working environment
    - Protection of the public
    - Protection of work personnel

2. **Personal protective equipment**:

    - Safety glasses/goggles
    - Hard hats
    - Dust mask/respirators
    - Ear plugs/muffs
    - Gloves
    - Reflective vests
    - Safety boots
    - Safety harness

3. **Safety responsibilities**:

    - Personal protection
    - Safe interactive practices
    - Protection of the public and the environment

4. **Emergency equipment:**

    - Fire fighting
    - Medical first aid
    - Evacuation

UNDERPINNING KNOWLEDGE AND SKILLS

You need to know and understand:

1. What are the workplace and equipment safety requirements.
2. What are the relevant acts, regulations and codes of practice relating to safety at work.
3. What are the company policies and procedures relating to work.
4. What are the hazards associated with the workplace.
5. How to work safely to instructions.
6. How to use power and hand tools.
7. How to select materials according to requirements.
8. How to handle materials safely.
9. How to make personal protective equipment ready for use.
10. How to consistently select tools and equipment for workplace use.
11. How to safely adhere to safety signs, symbols and alarms when on site.
12. What are the manufacturer's and organisational safety procedures for pre-use checks.
13. Why it is important to follow health and safety techniques when handling chemical and hazardous materials and how to do so.
14. How to construct ladders and walk platforms from durable materials.
15. Why it is important to erect ladders and work forms safely at location and how to do so.
16 Why it is important to avoid overhead power lines and other obstructions and how to do so.
17. How to position power poles/boxes safely for work use.
18. How to carry out work safely using electrical power supply.
19. Why it is important to clean, maintain and store tools and equipment according to manufacturer's recommendations and organisational procedures and how to do so.
20. How to dispose of waste materials safely from the site according to regulatory environmental legislation.

EVIDENCE GUIDE

For assessment purposes:

(1) Critical Aspects of Evidence

Candidates must prove that they can carry out **all** of the elements, meeting **all** the performance criteria, range and underpinning knowledge **on more than one occasion**. This evidence must come from a real working environment.

(2) Method of Assessment

Assessors should gather a range of evidence that is valid, sufficient, current and authentic.

Evidence may be collected in a variety of ways including:

- Observation
- Written/oral questioning
- Written evidence
- Witness testimony
- Professional discussion

Questioning techniques should not require language, literacy or numeracy skills beyond those required in this unit of competency.

(3) Context of Assessment

This unit may be assessed on the job, off the job or a combination of both. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by a candidate working alone or as part of a team. The assessment environment should not disadvantage the candidate.

The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

Simulation **should not be used**, except in exceptional circumstances where natural work evidence is unlikely to occur.

UA36701 Perform basic computations

Unit Descriptor:

This unit covers the knowledge, skills and attitudes required to estimate approximate answers to arithmetical problems, carry out basic calculations involving percentages and proportions, and determine simple ratios and averages. It includes producing and interpreting simple charts and graphs.

ELEMENT	PERFORMANCE CRITERIA
To be competent you must achieve the following:	
1. Determine work requirements	1.1 Establish the required outcomes from job instructions.
	1.2 Obtain data from **relevant sources** and interpret correctly according to work requirements.
	1.3 Determine the required calculation method to suit the **application** including the selection of relevant **arithmetic operations** and formulae.
	1.4 Estimate expected results including rounding off as appropriate.
2. Perform calculations	2.1 Apply calculation methods correctly according to relevant **arithmetic operations** and formulae.
	2.2 Obtain and check correct answers according to relevant **arithmetic operations** and formulae.
3. Produce charts and graphs from given information	3.1 Transpose data accurately to produce **charts and graphs**.
	3.2 Produce **charts and graphs** accurately to reflect the data on which they are based.

RANGE STATEMENT

All range statements must be assessed:

1. **Relevant sources:**

    - Charts
    - Graphs
    - Diagrams
    - Measurement data
    - Reference manuals
    - Specifications

2. **Application:**

    - Pressure
    - Volume
    - Temperature
    - Heat
    - Speed
    - Power
    - Elasticity
    - Density
    - Mass
    - Force

3. **Arithmetic operations:**

    - Subtraction
    - Addition
    - Multiplication
    - Division
    - Decimals
    - Fractions
    - Mixed and whole numbers
    - Percentages
    - Algebraic expressions
    - Proportions and ratios

UNDERPINNING KNOWLEDGE AND SKILLS

You need to know and understand:

1. How to perform calculations involving whole numbers using all four basic rules.
2. How to perform calculations involving length, perimeter, area and volume.
3. How to check calculated answers for accuracy.
4. How to round off estimated answers.
5. How to select appropriate formulae for the given application.
6. How to use appropriate mathematical operations.
7. How to perform calculations involving ratios or proportions.
8. How to determine required information from appropriate charts or graphs.
9. How to produce simple charts or graphs from given information or observations made.
10. How to select and use appropriate scales in the production of charts and graphs.
11. How to read and interpret information on written job instructions.
12. How to plan and sequence operations.
13. How to check and clarify task-related information.
14. How to check for conformance to specifications.
15. How to undertake numerical operations, geometry and calculations and formulae within the scope of this unit.
16. What are the formulae applicable to perimeter, area and volume of simple shapes.
17. What are the techniques for estimating approximate answers.
18. What are the concepts of perimeter, area and volume.
19. What are the procedures for rounding off figures when estimating approximate answers.

EVIDENCE GUIDE

For assessment purposes:

(1) Critical Aspects of Evidence

Candidates must prove that they can carry out **all** of the elements, meeting **all** the performance criteria, range and underpinning knowledge **on more than one occasion**. This evidence must come from a real working environment.

(2) Method of Assessment

Assessors should gather a range of evidence that is valid, sufficient, current and authentic.

Evidence may be collected in a variety of ways including:

- Observation
- Written/oral questioning
- Written evidence
- Witness testimony
- Professional discussion

Questioning techniques should not require language, literacy or numeracy skills beyond those required in this unit of competency.

(3) Context of Assessment

This unit may be assessed on the job, off the job or a combination of both. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by a candidate working alone or as part of a team. The assessment environment should not disadvantage the candidate.

The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

Simulation **should not be used**, except in exceptional circumstances where natural work evidence is unlikely to occur.

UA36801 Prepare engineering drawings

Unit Descriptor:

This unit covers the knowledge, skills and attitudes required to prepare and modify engineering drawings using manual drafting methods.

ELEMENT	PERFORMANCE CRITERIA

To be competent you must achieve the following:

1. Prepare to produce engineering drawings	1.1 Identify, obtain and confirm the occupational health and safety procedures for a given work area according to organisational requirements.
	1.2 Follow established occupational health and safety risk control measures and procedures in preparation for the work.
	1.3 Determine the extent of work from project specifications and discussions with **appropriate personnel**.
	1.4 Consult **appropriate personnel** to ensure that work is coordinated effectively with others involved on the work site.
	1.5 Obtain the required **tools and equipment** for the work in accordance with established procedures.
2. Produce engineering drawings	2.1 Carry out occupational health and safety risk control measures and procedures for given work according to organisational requirements.
	2.2 Determine the required types of design **drawings** and layouts from project specifications.
	2.3 Interpret technical data of components to determine parameters that are to be included in the **drawings**.
	2.4 Use appropriate tools and equipment to produce **drawings** based on standard protocols.

	2.5 Check **drawings** for accuracy and compliance with project specifications.
	2.6 Select appropriate methods for dealing with unexpected situations on the basis of safety and specified work outcomes.
3. Complete engineering drawings	3.1 Submit completed **drawings** to **appropriate personnel** to be checked for accuracy and compliance with project specifications.
	3.2 Resubmit any alterations, additions or corrections to instructions to **drawings** for final approval in accordance with standard operating procedures.
	3.3 File copies of completed **drawings** securely in accordance with established procedures.

RANGE STATEMENT

All range statements must be assessed:

1. **Appropriate personnel**:

    - Client
    - Supervisor

2. **Tools and equipment:**

    - Drawing boards/tables
    - T-squares
    - Set squares
    - Drawing pens/pencils
    - Scale rules
    - Compass
    - Drawing templates
    - Dividers
    - Erasers
    - Computers and appropriate software

3. **Drawings:**

    - Details of design relationships and integration
    - Details of component features
    - Costing information
    - Manufacturing details

UNDERPINNING KNOWLEDGE AND SKILLS

You need to know and understand:

1. What are the safe working practices and methods when preparing engineering drawings manually.
2. What are the types, purpose and classification of drawings.
3. What are the basic drafting terms and conventions.
4. What are the symbols, codes and abbreviations used in drafting.
5. What are the fundamentals of drafting documentation including contents, version control, indexing, and product identification (e.g. logo, trademark).
6. What are the fundamentals relating to line conventions and lettering, sectional views, pictorial drawing, types and application of engineering drawings, conventional representations, descriptive geometry and revolutions.
7. What are the fundamentals of measurement types, forms units, symbols, reading and transfer.
8. What are the fundamentals of drafting by hand using triangles and T-square.
9. How to layout a basic drawing sheet.
10. What are the principles of lettering.
11. How to use drawing equipment to produce basic technical drawings.
12. What are the principles of geometric constructions.
13. What are the multi-view orthographic projections used in drafting.
14. What are the fundamentals relating to descriptive geometry.
15. What are the principles of sectioning.
16. What are the fundamentals of pictorial drawings.
17. What are the principles relating to dimensioning and tolerancing.
18. What are the principles of development.
19. What are the principles relating to laying out drawings.
20. What are the principles, concepts and applications relating to working drawings.
21. How to use and care for drafting instrument and equipment.

EVIDENCE GUIDE

For assessment purposes:

(1) Critical Aspects of Evidence

Candidates have to prove that they can carry out **all** of the elements, meeting **all** the performance criteria, range and underpinning knowledge **on more than one occasion**. This evidence must come from a real working environment.

(2) Method of Assessment

Assessors should gather a range of evidence that is valid, sufficient, current and authentic.

Evidence may be collected in a variety of ways including:

- Observation
- Written/oral questioning
- Written evidence
- Witness testimony
- Professional discussion

Questioning techniques should not require language, literacy or numeracy skills beyond those required in this unit of competency.

(3) Context of Assessment

This unit may be assessed on the job, off the job or a combination of both. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by a candidate working alone or as part of a team. The assessment environment should not disadvantage the candidate.

The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

Simulation **should not be used**, except in exceptional circumstances where natural work evidence is unlikely to occur.

UA26901 Prepare 2D drawings using computer aided design (CAD) systems

Unit Descriptor: This unit covers the knowledge, skills and attitudes required to produce 2 Dimensional drawings using computer-aided design (CAD).

ELEMENT	PERFORMANCE CRITERIA
To be competent you must achieve the following:	
1. Prepare the CAD environment	1.1 Confirm the **purpose of drawing**, type and other relevant instructions and information according to drawing procedures.
	1.2 Select methods and **equipment** suitable for developing the required **drawing**.
	1.3 Customise system variables, menus and drawing defaults to suit standard operating procedures.
2. Prepare dimensional drawings	2.1 Create **drawings** using the full capability of the available software system.
	2.2 Link **drawing** entities to database attributes to suit job requirements.
	2.3 Create detailed views using various scales to meet job requirements.
	2.4 Edit **drawings** using appropriate computer commands.
	2.5 Indicate and justify deviations from standard conventions where they occur.
	2.6 Conduct **checks** and obtain approvals regarding content and presentation of **drawings**.
	2.7 Save files in various **formats** according to organisational procedures.
	2.8 Send files to relevant personnel over the internet using the appropriate **format**.

RANGE STATEMENT

All range statements must be assessed:

1. **Purpose**

- Show relationships
- Define shapes
- Communicate design
- Procurement
- Contract definition
- Production

2. **Drawing**

- Sketches
- Components
- Presentation

3. **Checks**

- Accuracy
- Correct scales
- Line density
- Annotation
- Title panel
- Layout of components
- Presentation
- Completeness

4. **Formats**

- IGES
- DXF
- HPGL

5. **Equipment**

- Computer equipped with CAD software
- Printer

UNDERPINNING KNOWLEDGE AND SKILLS

You need to know and understand:

1. What are the ergonomic considerations relating to computer workstations.
2. What are the safety precautions to observe when using computer equipment for CAD applications.
3. What are the CAD commands used to produce 2D drawings.
4. What are the procedures for creating 2D drawings.
5. How to safely use the computer workstation.
6. How to set up computer workstations to produce drawings.
7. How to manipulate and manage computer files.
8. How to use computer hardware and CAD software commands to produce 2D drawings.
9. How to apply knowledge of macro and LIST programming to troubleshoot macro and LIST routines.

EVIDENCE GUIDE

For assessment purposes:

(1) Critical Aspects of Evidence

Candidates must prove that they can carry out **all** of the elements, meeting **all** the performance criteria, range and underpinning knowledge **on more than one occasion**. This evidence must come from a real working environment.

(2) Method of Assessment

Assessors should gather a range of evidence that is valid, sufficient, current and authentic.

Evidence may be collected in a variety of ways including:

- Observation
- Written/oral questioning
- Written evidence
- Witness testimony
- Professional discussion

Questioning techniques should not require language, literacy or numeracy skills beyond those required in this unit of competency.

(3) Context of Assessment

This unit may be assessed on the job, off the job or a combination of both. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by a candidate working alone or as part of a team. The assessment environment should not disadvantage the candidate.

The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

Simulation **should not be used**, except in exceptional circumstances where natural work evidence is unlikely to occur.

UA37001 Produce freehand sketches

Unit Descriptor:

This unit covers the knowledge, skills and attitudes required to complete freehand sketches to illustrate or communicate information to be used in engineering drafting applications. It covers standard drawing conventions and techniques to represent the subject in appropriate proportion and view.

ELEMENT	PERFORMANCE CRITERIA
To be competent you must achieve the following:	
1. Determine sketch requirements	1.1 Determine the purpose, scope and presentation context for the sketch and the information needs of the audience.
	1.2 Identify **key features**, dimensions and **orientation**, structures, **services** and features for inclusion.
	1.3 Obtain any **additional information** to facilitate the sketch according to drawing requirements.
	1.4 Determine suitable sketching techniques and select and prepare **materials** to complete the work activity.
	1.5 Access, interpret and apply compliance of safety procedures relevant to the work activity.
2. Create simple sketches of pictorial, orthographic and sectional views	2.1 Prepare simple freehand sketches using standard orthographic projection and pictorial **conventions**.
	2.2 Prepare sectional details of simple structural or mechanical elements and elevations using standard orthographic projection drawing practice.
	2.3 Examine and apply principles of descriptive geometry to ensure the correct perspective is achieved.
	2.4 Apply industry specific terminology and symbols and include specifications, as required, to convey the required information.

		2.5 Identify and label the sketch to confirm currency and purpose.
		2.6 Check and confirm that the sketch is an accurate representation of the subject and apply standard drawing conventions.
3.	Produce sketches of geometric shaped objects	3.1 Sketch geometric shapes using correct construction techniques.
		3.2 Confirm that the sketch is an accurate representation of the subject and apply standard drawing conventions.
4.	Produce pictorial sketches of engineering components	4.1 Select principal axes and angles according to drawing requirements.
		4.2 Sketch isometric and non-isometric lines according to drawing requirements.
		4.3 Construct pictorial circles and arcs according to drawing requirements.
		4.4 Sketch isometric, oblique and perspective views according to drawing requirements.
		4.5 Conduct calculations, as required, to ensure correct dimensions and proportions and construct and use scales for sketch.
		4.6 Complete border and title blocks and confirm that the sketch is an accurate representation of the subject and apply standard drawing conventions.

RANGE STATEMENT

All range statements must be assessed:

1. **Key features:**

    - Location
    - Shape
    - Size
    - Layout
    - Type

2. **Orientation**:

    - Location of parts
    - Relationship to other parts

3. **Services**:

    - Drainage
    - Sewerage
    - Gas
    - Telephone and cable
    - Water
    - Electricity
    - HVAC

4. **Additional information:**

    - Measurements and dimensions
    - Design specifications
    - Materials

5. **Materials:**

    - Pencils
    - Graph paper
    - Cartridge paper
    - Tracing paper
    - Electronic sketch pad/tablet

6. Standard drawing conventions:

- Sectioning
- Line types
- Appropriate view position
- Symbols
- Dimensioning technique
- Number of views
- Proportion
- Presentation

7. Construction techniques:

- Use of parallel lines
- Equal division of lines
- Bisection
- Construction of angles
- Construction of plane figures
- Tangent points

8. Drawing techniques:

- Orthographic projection
- Sheet preparation format
- Dimensioning
- Sectioning

UNDERPINNING KNOWLEDGE AND SKILLS

You need to know and understand:

1. What are the elements and principles of design and their specific application to drawings.
2. What are the techniques, methods and principles of technical drawing used in descriptive geometry.
3. What is the legislation related to intellectual property in producing drawings.
4. What are the environmental and occupational safety and health issues associated with tools and materials used for drawing.
5. What are the principles associated with plane geometry.
6. What are the principles associated with preparing simple sketches.
7. What are the principles of orthographic and sectional views.
8. What are the symbols and terminology associated with drawings.
9. How to apply spatial principles to achieve scale and proportion.
10. How to select correct media and materials to produce freehand sketch of components.
11. How to apply freehand drawing techniques and conventions in production of sketches in pictorial, orthographic and sectional views.
12. What are the requirements of title blocks and border and how to complete them.

EVIDENCE GUIDE

For assessment purposes:

(1) Critical Aspects of Evidence

Candidates must prove that they can carry out **all** of the elements, meeting **all** the performance criteria, range and underpinning knowledge **on more than one occasion**. This evidence must come from a real working environment.

(2) Method of Assessment

Assessors should gather a range of evidence that is valid, sufficient, current and authentic.

Evidence may be collected in a variety of ways including:

- Observation
- Written/oral questioning
- Written evidence
- Witness testimony
- Professional discussion

Questioning techniques should not require language, literacy or numeracy skills beyond those required in this unit of competency.

(3) Context of Assessment

This unit may be assessed on the job, off the job or a combination of both. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by a candidate working alone or as part of a team. The assessment environment should not disadvantage the candidate.

The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

Simulation **should not be used**, except in exceptional circumstances where natural work evidence is unlikely to occur.

U68402 Contribute to the protection of the environment

Unit Descriptor:

This unit deals with the knowledge, skills and attitudes required to conduct work activities in a manner that protects the environment. Candidates should take steps to minimize any negative impact on the environment by completing tasks and activities in a way which causes as little damage or disturbance as possible to the environment while following organizational procedures.

ELEMENT	PERFORMANCE CRITERIA
To be competent you must achieve the following:	
1. Work in an environmentally conscious way	1.1 Perform duties in accordance with **relevant policies and legislation**.
	1.2 Execute duties in a **manner which minimises environmental damage**.
	1.3 Operate and handle **equipment** and **materials** in a **manner that minimises environmental damage**.
2. Contribute to continuous improvements in protecting the environment	2.1 Identify instances of likely or actual environmental damage and take appropriate action.
	2.2 Identify improvements to procedures and practices in terms of good environmental practice and report to relevant persons.
	2.3 Dispose of **hazardous** and **non-hazardous waste** safely according to approved legislative procedures and practices.
	2.4 Contribute to sustainable development particularly in the conservation of energy, water, use of resources and equipment to minimise environmental damage.

RANGE STATEMENT

All range statements must be assessed:

1. **Relevant policies and legislation:**

    - Organisational policies
    - Health and safety at work
    - Environmental legislation
    - Solid waste management policies
    - Recyclable policies

2. **Manner which minimises environmental damage:**

    - Using recycled/reused items and materials where appropriate
    - Disposing of polluting substances safely
    - Reducing the volume of waste
    - Using biodegradable and eco-friendly chemicals
    - Planning tasks to reduce the use of fuel and electricity

3. **Equipment and materials**

    - Hand tools
    - Power tools
    - Personal protective equipment
    - Cleaning chemicals
    - Soaps and santisers
    - Paper towels
    - Garbage disposal bags
    - Cloths and towels
    - Containers
    - Access equipment

4. **Hazardous waste:**

    - Oils
    - Chemicals and solutions
    - Harmful materials (asbestos, fibreglass)
    - Electronic equipment
    - Organic hazards (pest excrement, pest carcasses)

5. **Non-hazardous waste:**

    - Food
    - Plant matter
    - Paper

UNDERPINNING KNOWLEDGE AND SKILLS

You need to know and understand:

1. What are the relevant policies and legislation governing environmental protection.
2. How to recognise any likely or actual environmental damage.
3. What are the appropriate actions to take in the discovery of likely or actual environmental damage.
4. What are the ways in which tools and materials should be used in order to minimise environmental damage.
5. What are the different types of pollution.
6. What are the consequences of pollution.
7. How to recognise wastage of energy, water, equipment and materials.
8. What are the methods of working that will minimise pollution and wastage of resources.
9. What are the types of damage which may occur, the impact these can have on the environment and corrective actions to be taken.
10. What are the methods of waste disposal which will minimise the risk to the environment.
11. What are the organisational requirements to prevent wastage.

EVIDENCE GUIDE

For assessment purposes:

(1) Critical Aspects of Evidence

Candidates must prove that they can carry out **all** of the elements, meeting **all** the performance criteria, range and underpinning knowledge **on no less than three (3) occasions**. This evidence must come from a real working environment.

(2) Methods of Assessment

Assessors should gather a range of evidence that is valid, sufficient, current and authentic.

Evidence may be collected in a variety of ways including:

- Observation
- Written/oral questioning
- Witness testimony
- Personal statement
- Written evidence (projects or assignments)
- Case study and scenario analysis
- Role play/simulation

(3) Context of Assessment

This unit may be assessed on the job, off the job or using a combination of both. Where assessment occurs off the job, that is, the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by a candidate working alone or as part of a team. The assessment environment should not disadvantage the candidate.

The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, products and manufacturing specifications, codes, standards, manuals and reference materials.

Simulation **should not be used**, except in exceptional circumstances where natural work evidence is unlikely to occur.

Level 1 Glossary of Terms

Assessment methods

The methods which can be used to determine competence in performance and underpinning knowledge.

Assessors

The Assessor's role is to determine whether evidence presented by a candidate for assessment within the programme meets the required standard of competence in the relevant unit or element. The Assessor needs to be competent to assess to national standards in the area under assessment.

Approved Centre

Organisation/Centre approved by the TVET Council to offer full National Vocational Qualifications.

Case Studies

In situations where it is difficult for workplace assessment to take place, case studies can offer the candidate an opportunity to demonstrate potential competence.

A case study is a description of an actual or imaginary situation presented in some detail. The way the case study is presented will vary depending upon the qualification, but the most usual methods are written, taped or filmed.

The main advantage of a case study is the amount of evidence of underpinning knowledge it can generate and the specific nature of the evidence produced.

Competence

In the context of vocational qualifications, competence means the ability to carry out prescribed activities to nationally pre-determined standards in an occupation. The definition embraces cognitive, practical and behavioural skills, underpinning knowledge and understanding and the ability to react appropriately in contingency situations.

Element

An element is a description an action, behaviour or outcome which a person should be able to demonstrate.

Explanation of NVQ Levels

NVQs cover five (5) levels of competence, from entry level staff at Level 1 through to senior management at Level 5.

Level 1 Glossary of Terms

Level 1 - Entry Level

Recognizes competence in a range of varied work activities performed in a variety of contexts. Most work activities are simple and routine. Collaboration with others through work groups or teams may often be a requirement. Substantial supervision is required especially during the early months, evolving into more autonomy with time.

Level 2 - Skilled Occupations

Recognizes competence in a broad range of diverse work activities performed in a variety of contexts. Some of these may be complex and non-routine and involve some responsibility and autonomy. Collaboration with others through work groups or teams and the guidance of others may be required.

Level 3 - Technician and Supervisory Occupations

Recognizes competence in a broad range of complex, technical or professional work activities performed in a wide variety of contexts, with a substantial degree of personal responsibility and autonomy. Responsibility for the work of others and the allocation of resources are often a requirement. The individual is capable of self-directed application, exhibits problem-solving, planning, designing and supervisory capabilities.

Level 4 - Technical Specialist and Middle Management Occupations

Recognizes competence involving the application of a range of fundamental principles and complex techniques across a wide and unpredictable variety of contexts. Requires very substantial personal autonomy and often significant responsibility for the work of others, the allocation of resources, as well as personal accountability for analysis, diagnosis, design, planning, execution and evaluation.

Level 5 - Chartered, Professional and Senior Management Occupations

Recognizes the ability to exercise personal professional responsibility for the design, development or improvement of a product, process, system or service. Recognizes technical and management competencies at the highest level and includes those who have occupied positions of the highest responsibility and who have made outstanding contributions to the promotion and practice of their occupation.

External Verifier

The External Verifier is trained and appointed by the TVET Council and is competent to approve and ensure an approved Centre’s quality of provision.

Internal Verifier

The Internal Verifier acts in a supporting role for Assessors to ensure consistent quality of assessment and competence. They need to be competent to assess to national standards in the area under assessment.

Level 1 Glossary of Terms

NVQ

National Vocational Qualifications (NVQs) are work-based qualifications that assess an individual's competence in a work situation and certify that the individual can perform the work role to the standards expected in employment.

NVQs are based on national occupational standards of competence drawn up by standards-setting bodies known as Industry Lead Bodies. The standards describe the level and breadth of performance that is expected of persons working in the industry or sector which the NVQ covers.

NVQ Coordinator

Within each approved Centre offering NVQs, there is a centre contact who has overall responsibility for the operation and administration of the NVQ system.

Observation

Observation of the candidate carrying out his/her job in the workplace is the assessment method recommended in the vast majority of units and elements. Observation of staff carrying out their duties is something that most supervisors and managers do every day.

Performance Criteria

Performance criteria indicate what is required for the successful achievement of an element. They are descriptions of what you would expect to see in competent performance.

Product of Work

This could be items produced during the normal course of work, which can be used for evidence purposes such as reports, menus, promotional literature, training plans, etc.

Questioning

Questioning is one of the most appropriate ways to collect evidence to assess a candidate's underpinning knowledge and understanding.

Questioning can also be used to assess a candidate in those areas of work listed in the range which cannot be assessed by observation. Guidance on when this assessment method can be used is given in the assessment guidance of each individual element.

As an assessment method, questioning ensures the Assessor has all of the evidence about a candidate's performance. It also allows the Assessor to clarify situations.

Level 1 Glossary of Terms

Range Statements

The range puts the element of competence into context. A range statement is a description of the range of situations to which an element and its performance criteria is intended to apply.

Range statements are prescriptive, therefore, each category must be assessed.

Role-plays

Role-plays are simulations where the candidate is asked to act out a situation in the way he/she considers "real" people would behave. By using role-play situations to assess a candidate, the Assessor is able to collect evidence and make a judgement about how the candidate is most likely to perform. This may be necessary if the range specified includes a situation in which the candidate is unlikely to find himself/herself in the normal course of his/her work, or where the candidate needs to develop competence, before being judged competent, for example, in a disciplinary situation.

Simulations

Where possible, assessment should always be carried out by observing **natural performance** in the workplace. **Simulated performance**, however, can be used where specified to collect evidence about an aspect of the candidate's work which occurs infrequently or is potentially hazardous; for example, dealing with fires.

By designing the simulated situation, briefing the candidate and observing his/her performance, the Assessor will be able to elicit evidence which will help him/her judge how a candidate is **most likely** to perform in real life.

Supplementary Evidence

Supplementary evidence can be used to confirm and support performance evidence. Types of supplementary evidence include witness testimonies, reports, journals or diaries, records of activities, personal statements, simulation (see note in glossary).

Underpinning Knowledge

Underpinning knowledge indicates what knowledge is *essential* for a person to possess in order to successfully achieve an element and prove total competence.

Units

A unit of competence describes one or more activities which form a significant part of an individual's work. Units are accredited separately but in combination can make up a vocational qualification. There are three categories of units:

Mandatory units - are core to a qualification and must to be completed.

Optional units - candidates must choose the required number of individual units specified in the qualification structure, to achieve the qualification.

Additional units - are units which the candidate can undertake but are not a requirement to achieve a qualification.

Work-based Projects

Work-based projects are a useful way for the Assessor to collect evidence to support any decision he/she makes about a candidate's performance. They are particularly appropriate in determining the level of a candidate's underpinning knowledge and understanding where it may be insufficient to rely only on questioning or observation.

A project often involves the identification of a solution to a specific problem identified by the Assessor and/or the candidate (such as looking at ways to redress a recent drop in sales), or may be a structured programme of work built around a central situation or idea (such as the introduction of a new job rostering process).