



NUMERACY
Using number: Measuring
SCQF Level 3
10 Hour Unit

CORE SKILLS UNIT

ASSESSMENT SUPPORT PACK

Part 1: Information for tutors

What is involved?

This Unit is one of a group of three:

- ◆ Using number: calculation [20 hour Unit]
- ◆ Using number: measuring [10 hour Unit]
- ◆ Using graphical information [10 hour Unit]

Together these deliver the complete Numeracy Core Skill at SCQF level 3.

Using number: measuring is about using simple measuring skills in everyday personal, workplace, social and educational situations. The focus of the Unit is on transferable number skills. It is designed for delivery in schools, colleges, workplaces, community and other learning environments.

The learner will be expected only to work with familiar measuring instruments. The work will be simple and routine, using everyday concepts familiar to the learner.

Learner motivation can be maximised by making the numeracy activities as relevant as possible to the learner's likely uses for numeracy. The activities should consist of an appropriate mix from: personal, workplace, social and educational examples. Additionally, integration of the numeracy activities with those of other SQA Units being undertaken should be explored. For example, when a learner is undertaking vocational Units, motivation for numeracy can be increased if the activities are related to the vocational Unit and the learner can see the direct relevance of the numeracy.

Assessment and evidence

Learners at SCQF level 3 are required to deal only with simple measuring instruments in familiar situations.

You should try to identify naturally-occurring opportunities for assessment where possible. For learners who are also working towards vocational or subject based Units, opportunities for assessment of number skills could arise while completing vocational or subject based tasks which provide evidence for both the vocational or subject based Unit and this Unit. Some of the exemplars in this pack could be used or contextualised for this purpose.

The assessment process is likely to involve one or more of:

- ◆ written tasks
- ◆ oral questioning
- ◆ observation

When assessing by observation, you must keep a detailed checklist. Similarly if you use oral questioning, you must keep a record of both the questions and learner responses. All evidence, whether produced by the learner or a record made by yourself must be retained, signed and dated by you.

Planning

You should work out where opportunities for meeting the standards are likely to arise. Where possible this should be built into the assessment process. You should discuss this assessment process with the learners so that they are quite clear about what is expected from them.

Guidance on the Unit

What learners need to know or be able to do

The Unit states that on completion the learner will know how to:

- ◆ read and use simple measuring instruments (eg a ruler, metre stick, thermometer) to make measurements to the nearest marked number, or on a graph to make measurements to the nearest marked number.
- ◆ recognise common units in which different quantities are measured (eg length in centimetres or metres; weight in grams or kilograms; volume in litres)
- ◆ recognise and use whole numbers (eg 5) and decimal numbers (eg 2.45)
- ◆ make a simple numerical comparison between items
- ◆ use the results of your measuring activities to solve problems and make decisions

It is important to note that this Unit is based on using instruments with analogue scales. Digital readouts are not acceptable.

Some learners at this level will have had no experience of using measuring instruments. With such learners it is especially important to set the activities and learning in familiar contexts. In principle, the reading of any instrument scale is the same process regardless of what is being measured. However, you should use a variety of instruments here setting each in context. In this way the learner will become familiar with the different quantities which can be measured and additionally see the similarity of the procedures for the different quantities.

Quantities

There is a wide range of quantities to be encountered in everyday personal, workplace, social and educational situations. These might usefully be split up into the categories personal, environmental and work specific.

Personal quantities include weight, height and waist size. An example context is that of measuring height and weight as part of a personal health programme.

Environmental quantities include temperature, atmospheric pressure, rainfall and noise level. Concern about the state of the environment is widespread and it is a context which will be familiar to many learners. Noise level could be set in the context of noise pollution from road traffic at a variety of locations in the local district.

Work specific quantities arise naturally from the particular workplace activities of the learner.

Examples are:

- ◆ measuring out the volume of a product to be diluted with water in a hairdressing setting
- ◆ measuring the length of a plank of wood in preparation for sawing
- ◆ weighing an ingredient for a recipe in catering
- ◆ taking the temperature of a patient in nursing

Units

Time should be taken to explore with the learners the units used for the quantities being measured. You should always choose units to suit the task involved. There are two aspects here:

- ◆ The units should be the commonly used ones for the context. This usually means using metric units such as grams, and centimetres. However if the learner is in a workplace which bases measurement on non-metric quantities, then, these must be used.
- ◆ The magnitude of the unit must be appropriate. Waist measurement is not expressed in kilometres!

Instruments

In the personal and environment categories, there is a large range of instruments which you can use with the learners. In the environmental context, use could be made of a simple weather station. This could consist of a thermometer, barometer and rain gauge.

Perhaps the most common measurement for your learners is that of length. You can demonstrate the use of both rulers and measuring tapes, including the importance of positioning the zero of the scale precisely at the start of the measured length.

In any work situation, standard measuring instruments will be used. Thus the hairdresser will use a measuring column marked with a scale in millilitres.

Scales

The Unit gives specific guidance about the type of instrument scales to be used in the learner activities.

For this Unit the learner should use instruments with scales on which the main divisions are numbered and the subdivisions are marked but not numbered. The learners are only expected to measure to the nearest marked number.

The nature of the scale is that it has main divisions which are numbered and a non-stated quantity of unnumbered subdivisions. This allows for say one up to nine non-numbered divisions on the scale.



Above is an example of a scale with one subdivision. This could be found on a measuring tape using centimetres. There are half centimetre subdivisions.



The example above has numbered divisions as tens. This could be found on a thermometer.

The restriction that the learners are only expected to measure to the nearest marked number has an effect on the choice of instrument. While it may be

acceptable to use a centimetre scale to measure to the nearest centimetre (irrespective of the number of subdivisions), the choice of only 20 or 30

degrees would not be useful when measuring the temperature of a working environment.

It is important to choose an instrument whose scale is both appropriate for the type of measurement as well as fulfilling the Unit specification.

The concept of measuring to the nearest marked number must be explained to the learners and they should have plenty of opportunity to practice. You should explain to the learners that when the value is exactly half way between two marked numbers, it is conventional to choose the greater of the two.

Notation

Learners should be able to read and understand the notation for:

- ◆ whole numbers
- ◆ simple decimals

They should be able to convert between values written in words and numerical notation such as:

- ◆ sixty five = 65
- ◆ one point two five = 1.25.

Decimals should be to no more than two places eg 1.25

Basic operations

The learners should be familiar with the basic arithmetic operations of addition and subtraction. Calculations such as:

- ◆ $1.55 + 1.25 = 1.8$
- ◆ $25.5 - 1.3 = 24.2$

Comparisons/Decisions

The candidate will make use of subtraction to decide, for instance, that one temperature is greater than another.

Gathering evidence

It may be appropriate for you to gather written evidence produced by the learner carrying out practical exercises. However, written evidence is not essential for this Unit and is inappropriate if it disadvantages the learner.

You may wish instead to observe the learner carrying out a task and question them on completion. This requires you to create and complete record sheets comprising a checklist, questions asked and learner responses.

From the learner's point of view, it is very useful to be provided with a means of keeping all the work relevant to this Unit together. You can help here by creating and providing the learner with a workbook which includes all the evidence gathering items. An alternative is to provide worksheets which can be made into a portfolio or e-portfolio.

If you have chosen to integrate the numeracy work with that of other Units being undertaken by the learner, it may be possible to assess the numeracy as part of a larger single activity. In this case you must keep separate records of assessment decisions for this Unit.

Evidence for this Unit may be gathered in a variety of ways. Some typical activities might be:

- ◆ using scales to measure their own weight to find if they are below or above average weight
- ◆ using a thermometer to measure the temperature of a room to decide if the heating should be turned on
- ◆ using a measuring jug to check that the volume of milk it contains matches the amount required in a recipe
- ◆ using a speedometer in a car to see if they are keeping within the speed limit
- ◆ use a tape measure to measure a table to see if it will fit into a space

It is appropriate to gather evidence of the learners making successful measurements to meet the requirements of the Unit. These can be measurements of different quantities or one quantity. You should provide the correct measuring instrument for the activity to be carried out.

Part 2: Exemplar assessment tasks

Note

You can use the exemplar assessments given in this section in several ways:

- ◆ to help identify the type and amount of evidence which the learner needs to produce
- ◆ to help identify the level of complexity in evidence required for this Core Skill at this level
- ◆ to help you to create an assessment task related to the learner's own situation
- ◆ as an off-the-shelf assessment, although every effort should be made to source/provide learner(s) with their own meaningful context

Exemplar assessment

Task: Using simple measuring skills in everyday situations

- 1 You have been provided with a thermometer which is marked out with the degrees numbered and half degree marks unnumbered.
 - a) Make a measurement of the temperature of the room you are in just now. Your answer should be given to the nearest degree.
 - b) Is the temperature less than twenty five degrees Celsius?

- 2 You have been provided with a tape measure which is marked out with the centimetres numbered. There are four unnumbered divisions marked for each centimetre.
 - a) Make a measurement of the width each of the two tables in front of you. Your answers should be given to the nearest centimetre.
 - b) Will these two tables fit side by side into a space of 3.4m?

- 3 You are making environmental measurements in the workplace. You have been provided with a sound level meter measuring in dBA. The meter scale is marked out in numbered dBA with unnumbered half divisions in between. The meter is placed one metre from an office personal computer which is switched on and running normally.

Make a sound level measurement of the noise made by the personal computer. Your answer should be given to the nearest dBA.

- 4 You have been provided with a measuring jug which is marked out with the hundred millilitres numbered and the 50 millilitre marks unnumbered.
 - a) Make a measurement of the quantity of milk in the jug. Your answer should be given to the nearest hundred millilitres.
 - b) Is there enough milk for a recipe needing 300 millilitres?

Notes for assessment

The learner must successfully complete all of the elements in the task to achieve this Unit.

For each of the four activities as well as ensuring that the learner has obtained the correct answer to the nearest marked number, the measuring instrument must be used correctly. The learners should have practiced with the chosen instruments and you should make sure in each case that they are using them properly.

Points to check for are:

- ◆ the learner is using the thermometer correctly, avoiding parallax error by reading it looking straight on and not affecting the reading by say holding the thermometer by the bulb
- ◆ the tape measure is held taut without kinks and its zero is at one edge of the table
- ◆ this type of measurement is rather specialised but an obvious point is that the learner does not place an object, say a workbook in a position which will affect the sound reaching the meter
- ◆ the main check when using a measuring jug is to make sure that it is placed on the level.

This means that as well as the learner providing measurement results, the tutor should observe the activities and ensure that the instruments are used correctly.

Other than question three, each of the questions combine the measurement activity with numeracy skills. In questions one and four, this is an implied subtraction for the comparison. In question two, there is an addition and subtraction of decimals.

Part 3: Exemplar recording documentation

This section provides example forms which can be used by the learner and tutor to gather evidence and record assessment decisions. The first form, the record sheet, is an example of a form for the learner to complete when being assessed. There is a box for the tutor to note that each measurement has been made correctly. Alternatively, it can be completed by the tutor to record oral responses.

The two checklists are for completion by the tutor, recording assessment and Unit progress. In the first checklist, under the heading 'Activity' the tutor should insert the nature of the measurement eg measuring temperature.

Record sheet

Task: Using simple measuring skills in everyday situations.

1 You have been provided with a thermometer which is marked out with the degrees numbered and half degree marks unnumbered.

a) Make a measurement of the temperature of the room you are in just now. Your answer should be given to the nearest degree.

b) Is the temperature less than twenty five degrees Celsius?

a)	Tutor observation:
b)	

2 You have been provided with a tape measure which is marked out with the centimetres numbered. There are four unnumbered divisions marked for each centimetre.

a) Make a measurement of the width each of the two tables in front of you. Your answers should be given to the nearest centimetre.

b) Will these two tables fit side by side into a space of 3.4m?

a)	Tutor observation:
b)	

- 3** You are making environmental measurements in the workplace. You have been provided with a sound level meter measuring in dBA. The meter scale is marked out in numbered dBA with unnumbered half divisions in between. The meter is placed one metre from an office personal computer which is switched on and running normally.

Make a sound level measurement of the noise made by the personal computer. Your answer should be given to the nearest dBA.

a)	Tutor observation:
b)	

- 4** You have been provided with a measuring jug which is marked out with the hundred millilitres numbered and the 50 millilitre marks unnumbered.

a) Make a measurement of the quantity of milk in the jug. Your answer should be given to the nearest hundred millilitres.

b) Is there enough milk for a recipe needing 300 millilitres?

a)	Tutor observation:
b)	

Tutor signature:..... Date:.....

Assessment checklist

Candidate:		
Task: Using simple measuring skills in everyday situations.		
Activity	Evidence	Tutor comment / Date
1		
2		
3		
4		
Tutor signature: Date:		

Summary checklist

Candidate number:		
Candidate:		
Centre:		
Task	Date achieved	Tutor signature
Using simple measuring skills in everyday situations.		

Part 4: Information for learners

As you work through this Unit, your tutor will need to gather evidence that you are successfully completing the various tasks you do.

This can be done:

- ◆ by you completing an exercise
- ◆ by the tutor watching you work
- ◆ by the tutor asking you questions
- ◆ by you filling in a work book or diary

By the end of the Unit you must have shown that you can:

- ◆ read and use simple measuring instruments (eg a ruler, metre stick, thermometer) to make measurements to the nearest marked number, or on a graph to make measurements to the nearest marked number.
- ◆ recognise common units in which different quantities are measured (eg length in centimetres or metres; weight in grams or kilograms; volume in litres)
- ◆ recognise and use whole numbers (eg 5) and decimal numbers (eg 2.45)
- ◆ make a simple numerical comparison between items
- ◆ use the results of your measuring activities to solve problems and make decisions

These are some of the things you might do to provide the evidence:

- ◆ using scales to measure your own weight to find if you are below or above average weight
- ◆ using a thermometer to measure the temperature of a room to decide if the heating should be turned on
- ◆ using a measuring jug to check that the volume of milk it contains matches the amount required in a recipe
- ◆ using a speedometer in a car to see if you are keeping within the speed limit
- ◆ use a tape measure to measure a table to see if it will fit into a space

Learners with disabilities and/or additional support needs

The additional support needs of individual learners should be taken into account when planning learning experiences, selecting the most appropriate assessment activity and considering any reasonable steps which might be necessary to allow the learner to meet the assessment standard.

Further advice can be found in SQA's Assessment Arrangements' web pages (www.sqa.org.uk)

ADMINISTRATIVE INFORMATION

This Unit is part of a suite of three Units which when completed give automatic certification of the Core Skill of Numeracy at SCQF Level 3. The other Units in this suite are:

Using number: Calculation at SCQF Level 3

Using number: Measuring at SCQF Level 3

Credit Value

1 Credit(s) at (SQA Level 09) (6 SCQF credit points at SCQF Level 3)



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Helpdesk 0845 279 1000
Fax: 0845 213 5000
Email: customer@sqa.org.uk
Website: www.sqa.org.uk

Optima Building	Ironmills Road
58 Robertson Street	Dalkeith
Glasgow	Midlothian
G2 8QD	EH22 1LE

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