



NUMERACY
SCQF Level 5
40 Hour Unit

CORE SKILLS UNIT

ASSESSMENT SUPPORT PACK

Part 1: Information for tutors

What is involved?

Numeracy at SCQF level 5 is about applying numerical skills in personal, workplace, social and educational situations which involve graphical information and calculations. The focus of the Unit is on transferable numeracy skills:

- ◆ using number skills
- ◆ understanding tables, charts and diagrams
- ◆ producing tables, charts and diagrams

The Unit is designed for delivery in schools, colleges, workplaces, community and other learning environments. At this level, learners must understand tables, charts and diagrams, communicate information graphically, and apply a wide range of numerical skills.

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 be drawn from the learner's personal, workplace, social or educational situation. Additionally, integration of the numeracy activities with those of other SQA qualifications being undertaken should be explored. For example, when a learner is undertaking other National Qualifications, motivation for numeracy can be increased if the activities are related to these National Qualifications and the learner can see the direct relevance of the numeracy. If you do decide to adopt this approach, separate records of assessment decisions must be kept for this Unit and evidence for this Unit should be clearly accessible.

Assessment and evidence

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

Assessment is likely to be by one or more of:

- ◆ written tasks
- ◆ oral questioning
- ◆ observation

Assessment of the Unit should be based as far as possible on the everyday activities of the learner. You can find guidance on suitable assessment activities in Part 2 of this pack.

When you are assessing by observation, it is essential to keep a detailed checklist. When you are assessing by oral questioning, you must keep a copy of the questions asked and the answers given.

All items of evidence must be signed and dated by you.

Part 3 of this pack supplies exemplar forms which you can use to record successful completion of each of the Unit tasks. You can sign and date these as the learner achieves each task to keep a record of the learner's progress.

Planning

You should work out where opportunities for meeting the standard 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 learners will know how to:

- ◆ analyse situations to identify relevant numerical data and relationships in order to solve problems
- ◆ decide which operations to carry out the task and in what order to solve a problem
- ◆ use numerical or statistical concepts (eg quantitative and qualitative information; discrete and continuous data; numbers represented by symbols)
- ◆ interpret information from a single complex graphical form

Or

- ◆ from a series of straightforward related graphical forms
- ◆ select an appropriate graphical form and use it to communicate information

At SCQF level 5, learners will be able to work independently. They will work with tasks set in unfamiliar situations. Graphical information tasks may involve complex forms and will go beyond the simply extracting information.

You can break the Unit down into two areas:

- ◆ using number
- ◆ using graphical information

These two areas are explained individually below and additional information from the Unit is included.

Using number

The Unit assumes that the learners have the basic numeracy skills of:

- ◆ notation and use of whole numbers, decimals, percentages, fractions and ratios
- ◆ basic arithmetic operations
- ◆ rounding answers to specified numbers of decimal places
- ◆ positive and negative numbers

(You do not have to assess these directly)

A typical activity will require the learners to analyse the problem to find the relevant numerical values and work out which calculation steps are needed.

The activity should require several calculation steps. The formula example:

($S = ut + \frac{1}{2} at^2$) gives a guide to how many steps might be included.

The types of numeracy tasks will depend on the learner's environment.

However one or more of the following areas is expected to be involved:

- ◆ dealing with discrete or continuous data
- ◆ the differences between quantitative and qualitative data
- ◆ statistical concepts, eg range
- ◆ using symbols to represent data
- ◆ re-arranging formulae
- ◆ scientific notation with very large or very small numbers

An activity does not need to include all of the above and any one learner does not have to successfully complete activities covering all of the above.

You should note the following general points from the Unit. The learners:

- ◆ can carry out the calculations mentally, in writing, using a calculator or using another electronic device eg a computer
- ◆ are allowed to give exact or approximate answers as appropriate
- ◆ are encouraged to check their answers, although evidence of this checking is not required

Regarding the final point, you should encourage the learners to think of ways to make a check on their numeracy calculations.

It is not strictly part of the assessment but it is important that the learners have some confidence in their own calculations. This can be reinforced during feedback sessions following unsuccessful completion of assessments.

Using graphical information

At the SCQF 5 level, it is assumed that the learners will know the basics of using graphical information. They should be familiar with the common types of tables, graphs, charts and diagrams in everyday use. The learners must understand how to create graphical forms and know the appropriate applications for them. However, evidence of this for all of the graphical forms is not required.

In an activity where the learners are required to represent graphical information, they must decide on their own choice of graphical form (eg table, graph, chart and diagram).

Learners can create or complete the graphical forms by hand or using computer software, so long as they understand the underlying concepts. You may want to check this by questioning them.

When exploring information presented graphically, the learners must interpret information which has either been presented as a number of related straightforward forms or in one complex form (eg qualitative graphs; graphs where part of the axis has been omitted; histograms; graphs showing concepts/relationships such as cumulative frequency or complex variables; interpolation and extrapolation). The learners are to go beyond simply extracting values: they are expected to interpret the information. This is likely to be the case when the learners have to use more than one graphical form (or deal with a multidimensional graphical form) and then have to make an observation or further calculation.

As an indication of the complexity of the graphical forms the learners have to inspect, the activities might involve the following:

- ◆ qualitative graphs
- ◆ graphs where part of the axis has been omitted
- ◆ histograms
- ◆ graphs showing concepts/relationships eg cumulative frequency or complex variables
- ◆ extrapolation or interpolation of information

Gathering evidence

It may be appropriate for you to gather written evidence produced by the learners while carrying out the practical activities. However, written evidence is not essential for this Unit and is inappropriate if it disadvantages the learners. You may wish instead to use oral questioning. 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 paper-based 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 for this Unit.

The Unit requires learners to carry out numeracy tasks which involve:

- ◆ using numbers, carrying out calculations and drawing conclusions from their answers
- ◆ creating, extracting and analysing information from tables, graphs, charts or diagrams.

This may be achieved in many ways. Some typical activities might be:

- ◆ determining disposable income for a household from monthly accounts
- ◆ solving an engineering problem using a formula such as $S = ut + \frac{1}{2} at^2$
- ◆ costing the raw materials to decorate a room in a house
- ◆ calculating the number of people in a specific age group from a population pyramid
- ◆ producing a histogram showing a breakdown of users of a community facility by age, gender or income
- ◆ calculating acceleration from a velocity/time graph

It is possible that you could create a single activity which would provide evidence for the whole Unit. If this is not the case, or you do not think it to be appropriate for your learners, the assessment could be split into two tasks. These would be:

- ◆ Task 1: Numerical calculations
- ◆ Task 2: Graphical information

Part 2: Assessment Guidance

You can use the information 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 the Core Skill at this level
- ◆ to help you to create an assessment task related to the learner's own situation

You can use the following information to create task sheets to be used with the learners in assessment sessions. The task sheet will contain the assessment items and you can leave appropriate space for the learners to insert their responses.

Learners must complete both of the tasks.

Task 1 Covers numerical calculations. Successful completion should be noted on the checklist.

The Framework asks for a number of sustained calculations or one specialised calculation. This allows two alternatives. Exercise A requires the learners to perform in three questions successfully. Exercise B requires the learners to complete only one complex question. You must decide beforehand which approach to take.

Task 2 Covers extracting and conveying information using graphical forms. Successful completion should be noted on the checklist.

Task 1: Numerical calculations

This task covers the Unit requirements to:

- ◆ analyse situations to identify relevant numerical data and relationships in order to solve problems
- ◆ decide which operations to carry out and in what order to solve a problem
- ◆ use numerical or statistical concepts (eg quantitative and qualitative information; discrete and continuous data; numbers represented by symbols)

Exercise A

Three questions must be completed successfully

Personal/Social Context

- 1 Given one year's income and the tax bands and rates, calculate the income tax due.
- 2 Given the number of units used, and the charging structure, calculate the cost of the electricity consumed.
- 3 Given the radius of a required circular piece of material, calculate the area of wasted material if it can only be purchased as a square piece.

Educational Context

- 1 Calculate the combined resistance when two resistors are placed in parallel.
- 2 Calculate the mass of oxygen required to burn a given mass of hydrogen.
- 3 Calculate the energy content from temperature rise of a given quantity of water when one gram of substance is burnt.

Workplace Context

- 1 Given the break-even formula, fixed costs, cost price and selling price; calculate the number of items to be sold to break even.
- 2 Given the weight of a number of samples of a product, calculate the mean and range.
- 3 Given the amount of shampoo used in one week and the cost per litre, estimate the annual cost of shampoo.

Exercise B

This is an alternative to Exercise A.

One question must be completed successfully.

Personal/Social Context

Given the dimensions of a house, the heat transfer coefficients of walls, roof etc, calculate the heat loss for given internal and external temperatures.

Educational Context

Given information about arm strength on a population of men and arm strength information on a corresponding population of women, produce comparative figures for mean and median for each gender.

Workplace Context

Given the monthly total receipts and payments for one year's trading, calculate the profit and corporation tax liability.

Task 2: Graphical information

This task covers the Unit requirements to:

- ◆ interpret information from a single complex graphical form

Or

- ◆ from a series of straightforward related graphical forms
- ◆ select an appropriate graphical form and use it to communicate information.

Note: One communicating and one interpreting question must be completed successfully.

Personal/Social Context

Communicate: Production of literature for self-sufficiency. A volunteer has given the annual yields in kg for potatoes, onions, runner beans and broccoli obtained from an allotment for the past five years. Choose an appropriate graphical form and display the information.

Interpret: Comparing holiday destination weather. A series of bar charts showing the average sun hours, rainfall, temperature and wind speed by month for four destinations is provided. Decide upon a suitable destination and time of travel for a relative with specific requirements such as: doesn't mind rain, hates wind, likes a high temperature and lots of sun.

Educational Context

Communicate: Displaying experimental results. Ten temperature measurements are made at one minute intervals during an experiment. The experiment is carried out three times under different conditions. Choose an appropriate graphical form and display all three sets of readings.

Interpret: Leisure activities. Information on the numbers of a city population taking part in various leisure activities has been presented as a series of related pie charts showing: the proportions of residents attending sports events, visiting the cinema, viewing music performance, taking part in sport and taking part in musical activities; charts showing subdivisions of these activities, eg the proportions for different spectator sports, the proportions

viewing different sorts of musical performances. A question can be posed such as: Do more people play rugby than sing in choirs?

Workplace Context

Communicate: Sales information. Data on sales for four different financial products at three branch offices for the past year is supplied. Choose an appropriate graphical form and display the information.

Interpret: Planning a European rail journey. Using the timetables for European rail, plan out a journey between two destinations with a return one week later. The journey should comprise three legs, each requiring the use of a different table, eg Glasgow — London; London — Brussels; Brussels — Charleroi.

Part 3: Exemplar recording documentation

This section provides sample forms which can be used by the learners and tutor to gather evidence and record assessment decisions.

If you have created task sheets, as described in Part 2, they can be used as an assessment record sheet to be completed by the learner directly or used by you to note the result of the discussions with the learner.

There is an assessment checklist for each of the tasks to be completed, signed and dated by you.

The final form is a summary checklist recording Unit progress to be completed, signed and dated by you.

Assessment checklists

Learner:			
Task 1: Numerical calculations			
<ul style="list-style-type: none"> ◆ analyse situations to identify relevant numerical data and relationships in order to solve problems ◆ decide which operations to carry out and in what order to solve a problem ◆ use numerical or statistical concepts (eg quantitative and qualitative information; discrete and continuous data; numbers represented by symbols) 			
Activity	Achieved (tick)	Evidence	Tutor initials and date
Exercise A			
Q1			
Q2			
Q3			
OR Exercise B			
Q1			
Date of completion:		Tutor signature:	

In the evidence column, indicate how the activity meets the requirements stated. Either the three questions of Exercise A or question one of Exercise B must be completed successfully.

Learner:			
Task 2: Graphical information			
<ul style="list-style-type: none"> ◆ interpret information from a single complex graphical form <p>or</p> <ul style="list-style-type: none"> ◆ from a series of straightforward related graphical forms ◆ select an appropriate graphical form and use it to communicate information 			
Activity	Achieved (tick)	Evidence	Tutor initials and date
Exercise A			
Q1			
Q2			
Date of completion:		Tutor signature:	

In the evidence column, indicate how the activity meets the requirements stated.

Summary checklist

Learner:		
Learner number:		
Centre:		
Task	Date achieved	Tutor signature
1: Numerical calculations		
2: Graphical information		

Part 4: Information for learners

As you work through this Unit, your tutor will need to gather evidence to prove that you have demonstrated all the numeracy skills.

This can be done by:

- ◆ your tutor asking you questions
- ◆ you carrying out a written task
- ◆ your tutor observing you

By the end of the Unit you must show that you can:

- ◆ analyse situations to identify relevant numerical data and relationships in order to solve problems
- ◆ decide which operations to carry out and in what order to solve a problem
- ◆ use numerical or statistical concepts (eg quantitative and qualitative information; discrete and continuous data; numbers represented by symbols)
- ◆ interpret information from a single complex graphical form

Or

- ◆ from a series of straightforward related graphical forms
- ◆ select an appropriate graphical form and use it to communicate information

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

- ◆ determining disposable income for a household from monthly accounts
- ◆ costing the raw materials to decorate a room in your house
- ◆ calculating the number of people in a specific age group from a population pyramid
- ◆ producing a histogram showing a breakdown of users of a community facility by age, gender or income
- ◆ calculating acceleration from a velocity/time graph

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

Credit Value

1 Credit(s) at (SQA Level 11) (6 SCQF credit points at SCQF Level 5)



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