



NUMERACY
SCQF Level 5
40 Hour Unit (F3GF 11)

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 that involve graphical information, calculations, and solving problems. The focus of the Unit is on transferable numeracy skills:

- ◆ using number skills
- ◆ understanding and using graphs, 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, graphs, 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 that 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 that 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 learners will:

- ◆ analyse situations to identify relevant numerical data and relationships in order to solve numerical 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)
- ◆ carry out a number of sustained calculations or at least one specialised calculation
- ◆ interpret information from a single complex graphical form or 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. Tasks may be set in unfamiliar situations where the relevant facts and their importance need to be clarified, or in more familiar situations where an analytical approach is needed. Graphical information tasks may involve a number of related, straightforward forms or one complex form. Interpreting information must go beyond simply extracting information and could include, where appropriate, interpolation and extrapolation.

You can break the Unit down into two areas:

- ◆ using number
- ◆ using graphical information

These two areas are explained individually below.

Using number

The Unit assumes that the learners will already have the basic numeracy skills and will be able to:

- ◆ add, subtract, multiply, and divide whole numbers and decimals
- ◆ work with fractions, percentages, and ratios, as appropriate
- ◆ round answers to specific numbers of decimal places

(Evidence of all of these is not required for this Unit.)

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

However, the learner must:

- ◆ solve problems involving at least one numerical or statistical concept, eg quantitative and qualitative data, discrete and continuous data, numbers represented by symbols, or a statistical concept such as range
- ◆ decide which operations are to be carried out to solve a problem, and the order in which to carry them out
- ◆ carry out a number of sustained calculations or at least one specialised calculation, eg a calculation involving a scientific formula to determine an outcome

Learners will round answers to an appropriate degree of accuracy, eg two decimal places or three significant figures.

Learners can carry out the calculations mentally, in writing, using a calculator or other electronic device, eg a computer.

Learners should check answers, although evidence of checking is not required. You should encourage the learners to think of ways to make a check on their numeracy calculations. This 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 SCQF level 5 it is assumed that the learners will know the basics of using graphical information. They should be familiar with a range of common graphical forms (such as 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, or 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.

The learners must interpret information that has been presented either 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). The learners are to go beyond simply extracting 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.

Extraction of information can include interpolation and extrapolation, where appropriate.

Gathering evidence

For verification purposes it is only necessary to retain evidence for each activity stated in the Unit. Learners must meet all of the requirements of the Unit (ie 100% achievement) but they do not have to do so as part of one exercise. Evidence can be collected where it occurs naturally in exercises performed in different contexts or it can be generated through one or more set assessment(s).

Where a tutor collects naturally occurring evidence for the Numeracy Core Skill, they must satisfy themselves that the learner is capable of fulfilling each of the activities stated in the Unit consistently. However, it will only be necessary for the tutor to retain one piece of evidence for each activity.

If a tutor opts to collect evidence through one or more set assessment(s) covering the activities stated in the Unit and a learner is successful in some but not all of the activities, that learner would only need to be reassessed in the activities they did not achieve.

Where a tutor collects evidence through one or more set assessment(s), it would normally be expected that considerable learning and teaching will have taken place prior to the learner undertaking the set assessment(s). As part of the learning and teaching, learners should have successfully completed tasks and exercises of a similar level to those they will tackle in each set assessment, on at least one occasion. In other words, learners will normally have shown in class activities that they are capable of working at the required level before they are deemed ready for each set assessment.

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 that includes all the evidence-gathering items. An alternative is to provide worksheets that 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 that 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 may be possible that a single activity could be created that 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 Unit assessment could be split into two smaller tasks. For example, some centres might choose to develop two tasks that will combine to cover all of the requirements of the Unit, eg:

- ◆ Task 1: Using number
- ◆ Task 2: Using graphical information

Disabled learners and/or those with additional support needs

The additional support needs of individual learners should be taken into account when planning learning experiences, selecting assessment instruments, or considering whether any reasonable adjustments may be required. Further advice can be found on our website www.sqa.org.uk/assessmentarrangements.

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 that 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 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.

The guidance given in the rest of this section is based on the example of a centre that chooses to develop two tasks to cover the assessment of this Unit. In the following pages examples are given of the type of calculations, measurements, and graphical information problems that could be set by the centre as part of the two tasks.

Task 1: Using number

This task covers the Unit requirements to:

- ◆ analyse situations to identify relevant numerical data and relationships in order to solve numerical 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)
- ◆ carry out a number of sustained calculations or at least one specialised calculation

The calculations used for this task could relate to the personal, social, educational, or workplace situations of the learners. Here are some suggestions for Task 1, with Exercise A giving examples where three questions are used to cover the appropriate Unit requirements and Exercise B giving examples where one complex question, requiring several steps, can provide evidence to cover all the appropriate Unit requirements.

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 the 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, and 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: Using 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 on a suitable destination and time of travel for a relative with specific requirements such as doesn't mind rain, hates wind, and 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 are 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 that can be used by learners and tutors 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: Using number			
<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) ◆ Carry out a number of sustained calculations or at least one specialised calculation 			
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 one question of Exercise B must be completed successfully.

Learner:			
Task 2: Using graphical information			
<ul style="list-style-type: none"> ◆ 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 			
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: Using number		
2: Using graphical information		

ADMINISTRATIVE INFORMATION

Credit value

6 SCQF credit points (1 SQA credit) at SCQF level 5



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