



**NUMERACY**  
SCQF Level 6  
40 Hour Unit (F3GF 12)

# CORE SKILLS UNIT ASSESSMENT SUPPORT PACK

## Part 1: Information for tutors

### What is involved?

Numeracy at SCQF level 6 is about applying numerical skills in personal, workplace, social, and educational situations that involve graphical information and calculations. 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 will be working with a wide range of numerical or statistical skills and complex graphical forms.

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 problems
- ◆ decide which operations to carry out, and in what order, to solve a problem (the process of reaching a solution will have several stages, some of which might involve more than one numerical calculation)
- ◆ use numerical or statistical concepts (eg use of formulae to represent relationships in symbolic form; manipulation of numbers represented by symbols; application of statistical concepts such as standard deviation)
- ◆ extract, analyse, and interpret information from complex graphical forms
- ◆ identify significant features in graphical information (eg patterns, scatter, discontinuities, and rates of change) and interpret these in relation to the underlying variables
- ◆ select an appropriate graphical form and use it to communicate information

At SCQF level 6 learners will be able to work with a high degree of independence and initiative. They will work with tasks set in unfamiliar situations where preliminary work needs to be done on gathering information and clarifying relationships between different pieces of 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 for and use of whole numbers, decimals, percentages, fractions, and ratios
- ◆ scientific notation
- ◆ basic arithmetic operations
- ◆ rounding answers to specified numbers of decimal places/significant figures
- ◆ positive and negative numbers

You do not have to assess these directly.

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:

- ◆ statistical concepts, eg standard deviation
- ◆ relationships in symbolic form
- ◆ rearranging formulae
- ◆ creating a model of the situation

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.

Suitably complex numerical tasks will consist of several stages. Some of the stages may require more than one numerical calculation. Learners may have to carry out preliminary work in identifying the relevant information and defining relationships within it.

For a single activity covering this part of the Unit, the learners might need to carry out calculations of standard deviation for two or more populations. Similarly in a financial activity, several scenarios would need to be calculated out and comparisons to be drawn to satisfy this part of the Unit with a single activity.

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

- ◆ can carry out the calculations mentally, in writing, using a calculator or other 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 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 SCQF level 6 learners must have wide-ranging experience of using graphical information. They should be familiar with the common types of tables, graphs, charts, and diagrams in everyday use. The learners must be able to create these graphical forms and know the appropriate applications for them. Evidence of this for all of the graphical forms is not required.

However, a detailed knowledge is required of at least **one** type of complex graphical form. Learners must decide themselves on the appropriate graphical form to be used when representing information.

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 are expected to analyse and interpret the information (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). This is likely to be the case when the learners have to make multiple readings from one or more graphical forms and then have to carry out further calculations.

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

- ◆ qualitative graphs
- ◆ patterns
- ◆ scatter
- ◆ discontinuities
- ◆ rates of change

Another possible feature is where graphical forms have been employed to partly disguise the information. This can occur when axis scales have been manipulated. Similarly, data points may have been chosen to give an over-optimistic picture (eg choosing very specific year-end points to show misleading yearly financial results).

## 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 related to their environment that involve:

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

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

- ◆ using data on size variations, on a random sample of products, to calculate 95% confidence limits on the mean weight of the products
- ◆ researching and comparing local and national data on children's health
- ◆ comparing five-year returns on a series of cash and stock market investment products
- ◆ using a population growth chart to forecast the need for secondary school places
- ◆ reading weather maps to make decisions as to whether to postpone a planned sailing outing
- ◆ producing a series of charts to demonstrate staff turnover rates for jobs requiring different entry qualifications

It is possible that you could create a single activity 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 assessment could be split into two tasks. These would be:

- ◆ 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](http://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 information on the following pages 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. It may be possible to cover all requirements for the Unit in one task or in several tasks depending on the learner and the context.

In the examples given on the following pages, the learners would need to complete two tasks.

Task 1 is designed to cover numerical calculations. Successful completion should be noted on the checklist. The Framework states that learners should carry out a number of sustained complex calculations. A minimum of four will demonstrate consistent performance.

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

## Task 1: Using number

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 use of formulae to represent relationships in symbolic form; manipulation of numbers represented by symbols; application of statistical concepts such as standard deviation)

It should be possible to cover the Unit requirements listed above through four set questions, and here are examples of four possible questions applied to three different contexts.

### Personal/social context

- 1 Negative equity — a motor car can be purchased by means of a loan repaid over one, three, five or seven years. Given a purchase price, interest rates, and depreciation rate for the car, compare the depreciated value of a motor car with the sum owed for each year of each of the repayment periods. Find out if at any point the sum still owed is more than the value of the car.
- 2 Comparison of savings accounts interest rates — you wish to invest £1000 for a period of five years with interest re-invested. You have the choice of three products: one has a fixed interest rate of 5.50%, the second has an introductory interest rate of 6.50% for the first year and then is set at 5.00%, and the third has a rate of 3% in the first year, increasing by 1% each year to 7% in the final year. Which product will give the greatest return at the end of the five years? This question requires use of the compound interest formula.
- 3 Healthy living — a large amount of data are available for people who have lived in city tenements over the past 30 years. These data relate to the age at death of the residents and which floors of the tenements they lived on. Process these data and investigate the correlation between floor lived on and longevity.
- 4 Safety awareness — a display on safe breaking distances for cars is to be produced. An appropriate formula has to be used to calculate the breaking distance for an average motor car from 50, 40, 30, 20, and 10 miles per hour, under both dry and wet surface conditions.

## Educational context

- 1 Analysis of experimental results involving two variables. The experiment yields 10 data points. It is suspected that there is a linear relationship between the two variables. Explore this relationship by calculating the correlation coefficient from the results.
- 2 Projectile motion — a calculation using the appropriate equation to determine terminal velocity.
- 3 Population study — using simple models for population growth, compare the outcomes after a period of 10 years for each of two scenarios with varying reproduction rates, immigration into, and migration from the country.
- 4 Electronic circuit — analysis of a passive circuit consisting of several loops. An alternative is the analysis of a circuit involving at least one transistor.

## Workplace context

- 1 Depreciation of fixed assets — using the depreciation formula and given depreciation rates and purchase price, calculate in which year the assets will be worth a particular fraction of their purchase price.
- 2 Quality control — the weights of 10 samples from each of three identical production lines are recorded. Statistical methods are to be used to find the mean weight and standard deviation for the samples from each production line. The performance of the three lines is to be compared with reference to target product weight and the spread observed.
- 3 Effect of advertising — data are available on advertising spend and sales of product on three products for the past seven years. Use the data to investigate the correlation between sales and advertising spend.
- 4 A calculation involving a formula such as Bernoulli's equation.

## Task 2: Using graphical information

This task covers the Unit requirements to:

- ◆ extract, analyse, and interpret information from complex graphical forms
- ◆ identify significant features in graphical information (eg patterns, scatter, discontinuities, and rates of change) and interpret these in relation to the underlying variables
- ◆ select an appropriate graphical form and use it to communicate information

It should be possible to cover the Unit requirements listed above through one question on communication and one on interpreting. Here are examples of the possible questions applied to three different contexts.

### Personal/social context

**Interpret:** A scatter diagram has been drawn up for males at each of the four ages (25, 35, 50, and 65 years) relating annual income to educational attainment. Information is to be extracted to investigate the effect of educational attainment and income at various stages in life. The calculation part of this could be used as one of the questions in Task 1.

**Communicate:** A graphical form has to be chosen and completed to illustrate the findings in the following question from Task 1.

**Safety awareness:** A display on safe breaking distances for cars is to be produced. An appropriate formula has to be used to calculate the breaking distance for an average motor car from 50, 40, 30, 20, and 10 miles per hour, under both dry and wet surface conditions.

### Educational context

**Interpret:** A set of UK maps giving regional information on income, house prices, car ownership, and incapacity benefit uptake is available. Make a comparison of the regions by analysing these maps.

**Communicate:** Given the characteristic values for an op-amp, draw up a diagram of a suitable circuit to give a voltage gain of 50.

### Workplace context

**Interpret:** A set of graphical forms are provided that have been designed to paint a rosy picture of the sales made by a company department. Analyse these and describe the true picture.

**Communicate:** A flow chart is to be created to illustrate a workshop procedure for newcomers. This would need to be of a complexity requiring several processing points and some conditional looping.

As well as retaining the learner task sheets with attached documentation, it will be useful to question the learners as they progress through the activities.

The learners must complete both activities successfully.

The evidence retained will be your checklist as will the learner task sheets and documentation.

## 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

- ◆ 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 use of formulae to represent relationships in symbolic form; manipulation of numbers represented by symbols; application of statistical concepts such as standard deviation)

Activity	Achieved (tick)	Evidence	Tutor initials and date
1			
2			
3			
4			
Date of completion:		Tutor signature:	

In the evidence column indicate how the activity meets the requirements stated. All four activities must be completed successfully.

<b>Learner:</b>			
<b>Task 2:</b> Using graphical information			
<ul style="list-style-type: none"> <li>◆ Extract, analyse, and interpret information from complex graphical forms</li> <li>◆ Identify significant features in graphical information (eg patterns, scatter, discontinuities, and rates of change) and interpret these in relation to the underlying variables</li> <li>◆ Select an appropriate graphical form and use it to communicate information</li> </ul>			
Activity	Achieved (tick)	Evidence	Tutor initials and date
1			
2			
Date of completion:		Tutor signature:	

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

## Summary checklist

<b>Learner:</b>		
<b>Learner number:</b>		
<b>Centre:</b>		
<b>Task</b>	<b>Date achieved</b>	<b>Tutor signature</b>
1: Using number		
2: Using graphical information		

## ADMINISTRATIVE INFORMATION

### Credit value

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



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