WORKPLACE CORE SKILLS
ASSESSMENT SUPPORT PACK

NUMERACY
SCQF Level 5

Part 1: Information for assessors

Part 2: Exemplar assessment tasks

Part 3: Exemplar recording documentation

Part 1: Information for assessors

What is involved?

The Unit is designed for the workplace and the content should involve tasks and skills that are suited to the requirements of the candidate's working environment. The focus of the Unit is on transferable numeracy skills:

- using number skills
- measuring
- using graphical format to find out information
- using graphical format to communicate information

These skills should be useful to candidates in their current and future jobs, as well as in their social and personal lives.

The Unit is designed for those who have a reasonable level of skill and experience in using numeracy skills within the workplace. The work undertaken in the assessments may have some complex aspects, and will require knowledge or experience of formal workplace numeracy, eg at intermediate or supervisor level. The Unit might be suitable for candidates who are currently working towards an SVQ/NVQ at level 1 or level 2.

Numeracy tasks can be combined with the other Core Skills Units: Communication, Information and Communication Technology, Problem Solving, and Working with Others. If you adopt this approach, records must be kept for each Core Skills Unit.

Guidance on the Unit

Candidates at SCQF level 5 are required to use number tasks set in unfamiliar situations. Graphical information tasks may involve complex forms and will go beyond the simple extraction of information. Candidates will work independently on the tasks but may ask you for clarity on anything within the Unit that they do not understand.

The 'What do I need to do' section of the Unit lists the knowledge, understanding, and competence that the candidates must have and what they need to do to prove this. You may want to discuss these with the candidates. The following notes give detailed pointers on the things candidates need to know and be able to do.

What candidates need to do

Using number

The Unit assumes that the candidates 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.

The types of numeracy tasks will depend on the work 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 such as range
- using symbols to represent data
- rearranging formulae
- scientific notation with very large or very small numbers

If you are providing learning for the candidates, it is not appropriate to deliver this abstractly. You are encouraged to make everything as relevant to the workplace as possible.

It is good practice to encourage candidates to check their calculations. Although not part of the assessment, it is important that candidates have some confidence in their own calculations.

Using graphical information

At SCQF level 5 candidates are required to make their own choice of graphical form (eg table, graph, chart, or diagram) when representing information. The candidates must understand how to create the graphical forms and know the appropriate applications for each.

When exploring information presented graphically, the candidates are to go beyond simply extracting values: they are expected to interpret the information. This is likely to be the case when the candidates 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.

The candidates will have to inspect the graphical forms carefully as the tasks can require the use of 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

How do candidates show they have achieved the Unit?

The Unit requires the candidates to provide evidence for each of the three tasks.

Task 1: Using number

Using numbers, apply a wide range of numerical skills to solve work-related problems.

Task 2: Use graphical format to find out information

Interpreting information from:

- a series of straightforward related graphical forms

  or

- a single complex graphical form

Task 3: Use graphical format to communicate information

Conveying information through tables, graphs, charts or diagrams.

There is no set number of times candidates should perform each of the individual tasks. They should be performed as often as is required for the assessor to be confident that their performance is consistently accurate.

Assessment requirements

Using number

Tasks may relate to unfamiliar situations, where the relevant facts and their importance need to be clarified, or to more familiar situations where an analytical approach is needed.

The candidates can carry out the calculations mentally or in writing, using a calculator or another electronic device, eg a computer. The candidates can give exact or approximate answers as appropriate. Candidates should be encouraged to check their answers, although evidence of this checking is not required. The numerical tasks must involve a number of steps and the order in which these steps must be carried out should not be obvious. It is assumed that the candidates will be able to add, subtract, multiply, and divide and to work with fractions, percentages, and ratios as appropriate but evidence of all of these is not required. Candidates must carry out a number of sustained calculations or at least one specialised calculation, eg involving a scientific formula.

Use graphical format to find out information

It is assumed that the candidates will be familiar with common types of tables, graphs, charts, and diagrams in everyday use but evidence of each of these is not required. The candidates must interpret information that has been presented either as a number of related straightforward forms or in one complex form. Interpreting information must go beyond simply extracting information and should include, where appropriate, interpolation and extrapolation.

Use graphical format to communicate information

When communicating information, the candidates must decide on the appropriate graphical form to be used.

Gathering evidence

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

You may wish instead to observe the candidates carrying out a task and use oral questioning. This requires you to create and complete a record of questions asked and candidate responses.

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

If you have chosen to integrate the numeracy work with other Units being undertaken by the candidates, 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.

You should try to identify naturally occurring opportunities for assessment where possible. 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 the following:

- observation
- recording
- oral questioning

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 the candidate responses. All evidence, whether produced by the candidate or a record made by yourself, must be retained, signed, and dated by you.

Planning

You should work out where opportunities for meeting the Unit standards are likely to arise. Where possible, these should be built into the assessment process.

You should explain and discuss this assessment process with the candidates so that they are clear about what is expected of them.

Part 2: Exemplar assessment tasks

Note for assessors

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

- to illustrate to candidates the type of materials that could be used to generate evidence
- to help identify the type and amount of evidence that candidates should have gathered in their portfolio
- to help identify the level of complexity in evidence required for the Core Skill at this level
- to help you to identify/create an assessment task related to the candidate's own work environment
- as an off-the-shelf assessment, although every effort should be made to source/provide candidates with assessment materials that relate to their specific area of work

Task 1: Using number — the task exemplar is presented in two parts. Part A covers a number of sustained calculations (approximately two to four). In this example candidates need to successfully complete three questions.

Part B requires candidates to successfully complete one complex question.

Candidates should carry out the part most appropriate to their working practice.

Task 2: Use graphical format to find out information — uses a variety of graphical forms.

Task 3: Use graphical format to communication information — candidates must make their own choice of graphical form.

Task 1: Using number

Complete either Part A or Part B.

Part A – Carry out a number of sustained calculations

1 You are required to give an estimation of income tax for one of the account managers in your office. Use the rates of income tax given in the table below.

Band	Rate
£0 to £2,230	10%
£2,231 to £34,600	22%
above £34,600	40%

The manager has a tax-free allowance of £5,225 and has an income of £46,500 before income tax.

Calculate the tax to be paid to the nearest pound. Show your working in the box.

2 You need to calculate the break-even point for a product line of microwave dishes that your company produces. The fixed costs are £24,000 and each dish costs a further £2 to produce. The dishes are sold for £3.50 each.

The break even formula is given by: $B = F/(S - P)$

where:

B = break-even number

F = fixed costs

S = selling price for one dish

P = production cost for one dish

Calculate the number of dishes your company will have to sell to break even. Show your working in the box.

3 Your company takes reducing emissions to help the environment very seriously. The employees make lots of trips in different sized groups. You have been given the job of producing guidance on the best types of transport for different situations.

As the company works in the road transport sector, all of those travelling are able to drive any of the vehicles.

Vehicle	Maximum number of occupants	mg CO_2 emissions per kilometre for vehicle
Small car	2	85
Large car	4	160
Minibus	12	400
Maxibus	36	1,400

Although the aim is to minimise the total CO_2 emissions for each trip you will find it helpful first to calculate the CO_2 emissions per kilometre per occupant for each of the four vehicles.

a) If a group of 18 employees need to travel a certain route, what would be the most environmentally friendly solution? (You may find that using more than one vehicle is best.) Show your working for this in the box.

b) If a group of 34 employees need to travel a certain route, what would be the most environmentally friendly solution? (You may find that using more than one vehicle is best.) Show your working for this in the box.

Part B – Carry out one specialised calculation

1 You are to carry out an investigation into heating in your office. The formula below gives the heat loss through the walls.

$Q = UA(T_{hot} - T_{cold})$

where Q = heat lost in watts (W)

U = heat transfer coefficient

A = surface area over which the heat is being transferred

T_{hot} = inside temperature

T_{cold} = outside temperature

Your office occupies a whole floor. The wall area is made up of window and brick. The floor and ceiling will be ignored as there are offices below and above.

The outside walls of the office form a rectangle 20 m long and 15 m wide. The walls are 2.5 m high.

10% of the wall area is window, the rest is brick.

The heat transfer coefficient for the window area is 4.00 and that for the brick wall is 2.00.

a) Calculate the total heat loss through windows and brick walls when the inside temperature is 20°C and the outside temperature is 5°C.

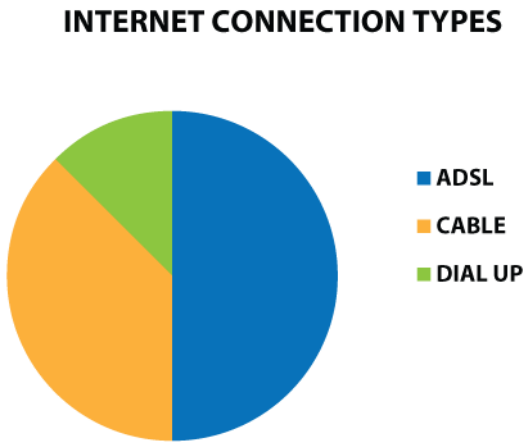
Each computer terminal in the office produces 100 watts of energy output.

b) Calculate the percentage of heat loss made up for by 20 computer units in the office. Give your answer to two decimal places.

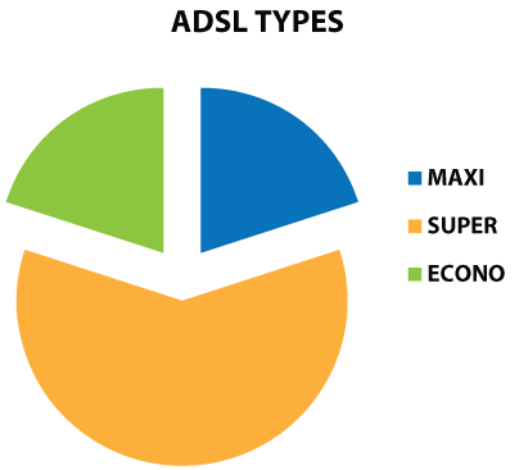
Task 2: Use graphical format to find out information

1 The following graphical forms give information for 100,000 internet users in a city.

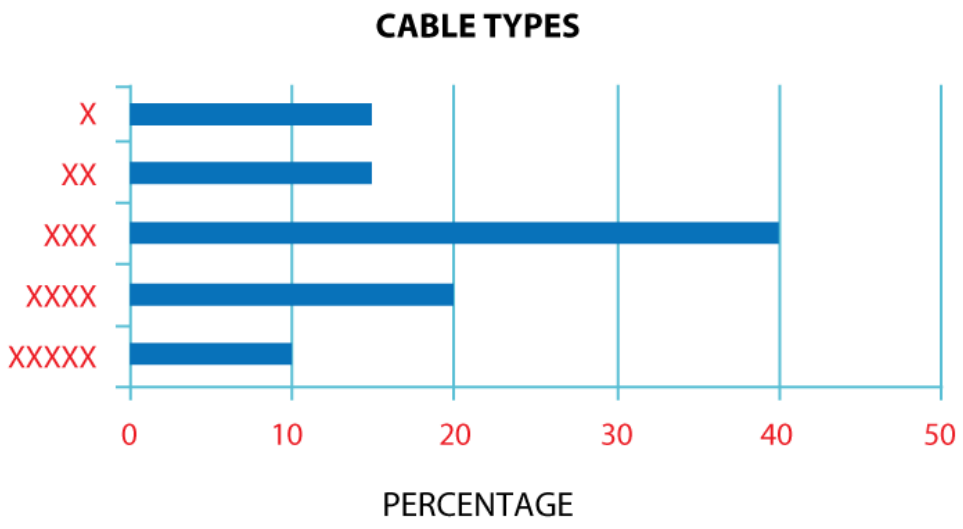
The first shows the proportions of users using each of three ways of connecting.



The second shows the speed type (econo, super and maxi) chosen by the ADSL users.

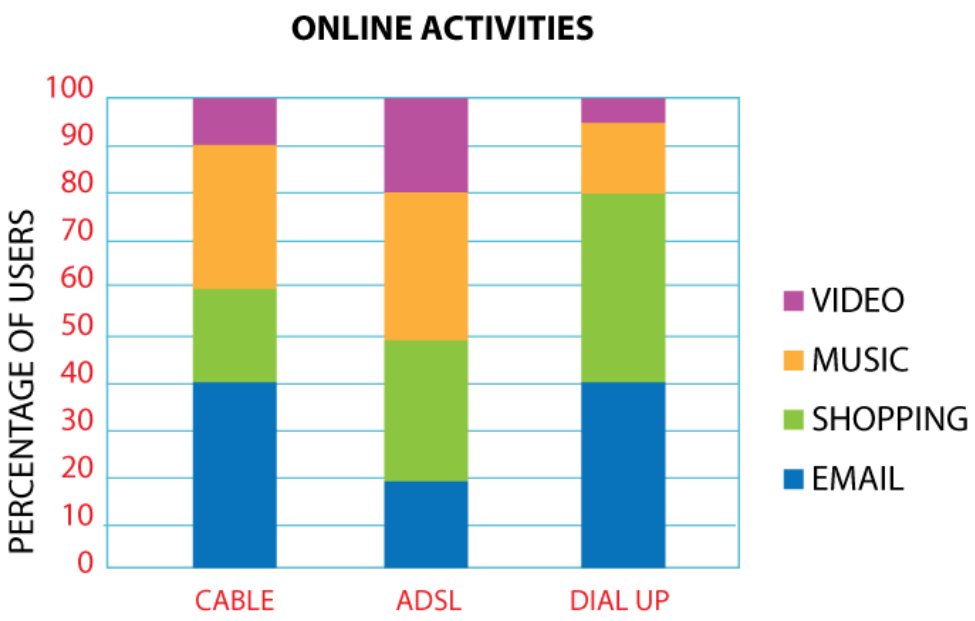


The third shows the speed type (X to XXXXX) chosen by cable users.



Users were asked what their main use for the internet was.

The fourth shows the proportions of users main use for the different types of connection method.



Use these graphical forms to answer the following questions. In each case show your working in the boxes.

a) How many dial-up users are there?

b) How many ADSL econo users are there?

c) Are there more dial-up users who mainly shop online than those who connect with XXX on cable?

Task 3: Use graphical format to communicate information

1 Your hairdressing company has five salons. In order to target boosting sales appropriately, information has been collected about the income from the different types of product sold. The table below illustrates this. The figures are in pounds (rounded to the nearest £100) and are for one year's trading.

Salon	Mousse	Fudge	Hairspray	Colorants
A	200	100	900	1,200
B	100	100	200	300
C	400	500	100	800
D	300	200	300	1,200
E	100	0	1,000	200

a) Choose an appropriate graphical form to represent the sales information. Create the graphical form and attach it to this task sheet.

You will note that because of the variation of total volume of sales, it is difficult to compare the proportions of products sold.

b) Process the information in the table so that each figure is the percentage of total sales for the salon.

c) Choose an appropriate graphical form to represent the new information. Create the graphical form and attach it to this task sheet.

Marking scheme

Candidates must successfully complete all three tasks to achieve the Unit.

The calculation examples are presented in these notes not as model answers but to indicate how they satisfy the requirements of the Unit.

Task 1: Using number

Part A

Q1 The candidates need to analyse the problem carefully. The tax-free allowance must first be removed and then the amounts at each rate apportioned.

Taxable income = £46,500 – £5,225 = £41,275

2,230 × 10% = £223

32,370 × 22% = £7,121.40

6,675 × 40% = £2,670

Total = £10,014

Q2 A formula using symbols must be utilised

24,000 ÷ (3.5 – 2) = 16,000 dishes

Q3 Very careful consideration of the possibilities must be made by the candidates. Some exploratory calculations would be expected before a final answer is decided on.

a) A minibus, a large car and a small car give the lowest emissions (645 mg).

b) The candidates should find out that the maxibus is not the best performer even when full of passengers. The minibus should be used as much as possible. The lowest emissions are found with three minibuses (1200 mg). The other option of two minibuses, two large cars and one small car is more by just 5 mg.

Part B

Q1 This is an example of a specialised calculation with a scientific formula and a large number of steps required.

a) The areas of window and brick must first be calculated.

Total area = 2 × 20 × 2.5 + 2 × 15 × 2.5 = 100 + 75 = 175 m^2

Window area = 175 × 10% = 17.5 m^2

Brick area = 157.5 m^2

Heat loss due to window = 4 × 17.5 × 15 = 1050 W

Heat loss due to brick = 2 × 157.5 × 15 = 4725 W

Total heat loss = 5775 W

b) The computer terminals will produce 2000 W. As a percentage this is:

(2000 × 100) ÷ 5775 = 34.63%

To achieve the task, the candidates must either complete the three questions of Part A successfully or question one of Part B.

Task 2: Use graphical format to find out information

Q1 This question requires the use of several of the graphical forms to find a solution.

a) The candidates are expected to use a protractor to measure the angle and thus obtain the answer of 12,500 users for dial-up.

b) Again a protractor can be used to find that there are 50,000 ADSL users of which 10,000 are econo users.

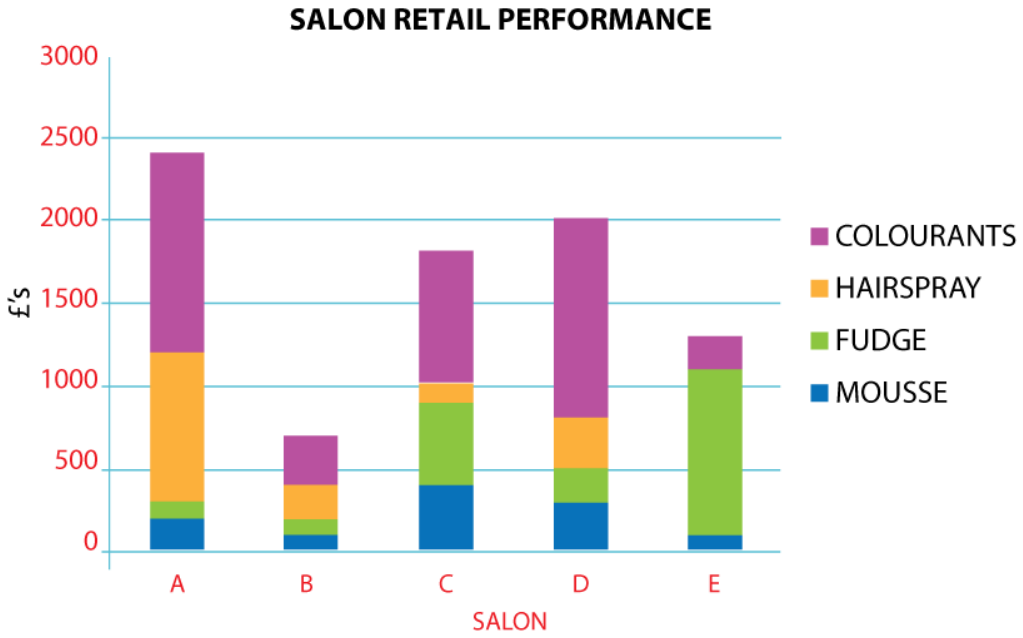
c) The dial-up users who shop are found by analysing the first and fourth graphical forms. This gives 40% of 12,500 ie 5,000.

The first, third and fourth graphical forms must be consulted to find the number of cable XXX shopping users. This gives 30% of 40% of 37,500, ie 4,500.

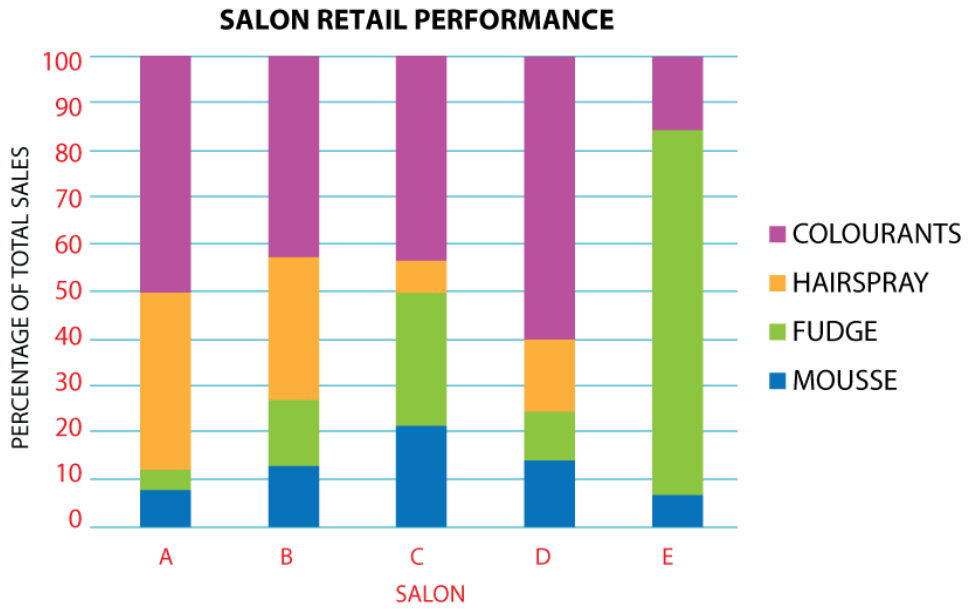
There are more dial-up users. To achieve the task candidates must complete the question successfully.

Task 3: Use graphical format to communicate information

Q1 a) The candidate should choose a graphical form that is capable of showing the three-dimensional information. A good example is the stacked bar chart.



b) and **c)** The results should be 'normalised' so that the proportions can be compared. Then the same type of graphical form can be re-drawn.



Part 3: Exemplar recording documentation

This section gives some examples of forms that could be used by candidates and/or assessors to gather evidence and record assessment decisions.

You are encouraged to adapt these materials to suit you and your candidates' preferred approach, ie boxes can be made bigger, format can be changed to a non-table format, font size etc.

Assessment plan

You should work out where naturally occurring opportunities for meeting the standards are likely to arise and, where possible, build them into the assessment process.

You should explain and discuss the assessment process with candidates so they are clear about what is expected of them.

Assessment checklists

Candidates could use the assessment checklists as a means of cross-referencing evidence in their portfolio to the Unit.

Assessors could use the assessment checklists to record assessment decisions and any relevant comments.

Summary checklist

The summary checklist enables you to record the results from the assessment checklists on a single form.

Assessment plan

Numeracy (SCQF level 5)

Candidate: _____

Task to be assessed: _____

Proposed date of assessment: _____

Proposed method of assessment	Tick	Notes
Assignment or project		
Observed performance		
Witness testimony		
Written questions		
Oral questioning		
Product evaluation, eg written document		
Previous evidence		
Other evidence		

Details agreed and signed by:

Assessor _____

Candidate _____

Line manager (if required) _____

Date _____

Assessment checklist

Numeracy (SCQF level 5) Task 1: Using number

Candidate name:_____ Date:_____

Task 1: Apply a wide range of numerical skills to solve work-related problems.			
	Evidence	**Assessor initials and date**	**Comments**
Analysed problems and situations and identified relevant numerical data and relationships			
Decided which operations to carry out and in what order			
Used numerical or statistical concepts, eg quantitative and qualitative information, discrete and continuous data, numbers represented by symbols, range			
Carried out a number of sustained calculations or Carried out one specialised calculation			
Rounded answers, eg to two decimal places			

Assessment checklist

Numeracy (SCQF level 5)

Task 2:Use graphical format to find out information

Candidate name:_____ Date:_____

Task 2: Use graphical format to find out information.			
	Evidence	**Assessor initials and date**	**Comments**
Interpreted information from ONE of the following: A series of straightforward related graphical forms such as tables, graphs, charts or diagrams or A single complex graphical form			

Assessment checklist

Numeracy (SCQF level 5)

Task 3: Use graphical format to communicate information

Candidate name:_____ Date:_____

Task 3: Use graphical format to communicate information.			
	Evidence	**Assessor initials and date**	**Comments**
Selected and created a suitable format to communicate information using ONE of the options listed below: ♦ Table ♦ Chart (eg bar or pie chart) ♦ Graph (eg a line graph with a scale) ♦ Diagram (eg of a two-dimensional shape)			

Summary checklist

Numeracy (SCQF level 5)

Candidate name:_____

Candidate number:_____

Centre:_____

Task	Date achieved
1 Using number	
2 Measuring	
3 Use graphical format to find out information	
Assessor's signature:_____	Date:_____

ADMINISTRATION INFORMATION

Credit Value

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