Unit Support Notes

Unit Support Notes — Numeracy (National 5)

Please refer to the note of changes at the end of this document for details of changes from previous version (where applicable).

Contents

Unit Support Notes

Introduction

These support notes provide advice and guidance to support the delivery and assessment of the Numeracy (National 5) Unit. They are intended for teachers and lecturers who are delivering the Unit.

They should be read in conjunction with the:

- the *Unit Specification*

Where the Numeracy (National 5) Unit is being undertaken as part of the National 5 Lifeskills Mathematics Course, these *Unit Support Notes* should also be read in conjunction with:

- the *Course Specification*
- the *Course Support Notes*
- the *Course Assessment Specification*
- appropriate assessment support materials

General guidance on the Unit

Aims

The Numeracy (National 5) Unit is a mandatory Unit in the National 5 Lifeskills Mathematics Course. The Numeracy Unit is also available as a free-standing Unit and is designed to meet the needs of a broad range of learners who may choose to study it.

The general aim of this Unit is to develop learners' numerical and information handling skills to solve real-life problems involving number, money, time and measurement. At this level, real-life problems will have some complex features and be set in contexts which are likely to be unfamiliar to the learner. As learners tackle real-life problems, they will decide what numeracy and information handling skills to use, and how to apply those skills to an appropriate level of accuracy. Learners will also interpret graphical data and use their knowledge and understanding of probability to identify solutions to solve real-life problems involving money, time and measurement. Learners will use their solutions to make and justify decisions.

Learners who complete this Unit will be able to:

1 Use numerical skills to solve real-life problems involving money/time/measurement
2 Interpret graphical data and situations involving probability to solve real-life problems involving money/time/measurement

In addition, learners will have the opportunity to develop generic and transferable skills for learning, skills for life and skills for work. These include numeracy and thinking skills.

Responsibility of all
All teachers/lecturers have responsibility for promoting the development of numeracy across learning. Numeracy, as a *Skill for Learning, Skill for Life and Skill for Work* is likely to be developed within a wide range of National Courses. Centres may wish to use these *Unit Support Notes* and the *Unit Specification* to ensure that all teachers/lecturers have a shared understanding of: the standards expected; how learners progress in numeracy; and of possible approaches to learning, teaching and assessment. Examples of cross-curricular approaches to Numeracy can be found in the section titled 'Approaches to learning and teaching'.

Progression into this Unit

Entry into this Unit is at the discretion of the Centre. However, learners would normally be expected to have attained the skills, knowledge and understanding required by one or more of the following or equivalent qualifications and/or experience:

- National 4 Lifeskills Mathematics Course or its component Units
- Numeracy (National 4) Unit

- Core Skills Numeracy (SCQF level 4)

Prior learning, life and work experiences may also provide an appropriate basis for entry into this Unit. This could include relevant skills, knowledge and understanding and appropriate experiences and outcomes from the mathematics curriculum area.

Centres wishing to establish the suitability of learners without prior qualifications and/or experiences and outcomes may benefit from carrying out a diagnostic review of prior life and work experiences. This approach may be particularly useful for adults returning to education.

Skills, knowledge and understanding covered in the Unit

Information about skills, knowledge and understanding is given in the National 5 Lifeskills Mathematics *Course Support Notes*.

This section provides further advice and guidance about skills, knowledge and understanding that could be included in the Unit. It should be read in conjunction with Appendix 1 of the National 5 Lifeskills Mathematics *Course Support Notes*.

The following table outlines suggested content for each Assessment Standard within the Unit:

Assessment Standard	Skills, knowledge and understanding
Outcome 1: Use numerical skills to solve real-life problems involving money/time/measurement	
1.1 Selecting and using appropriate numerical notation	Including: =, +, -, x, /, ÷, <, >, ( ), %, colon and decimal point and simple formulae Selecting and using appropriate units for money, time and measurement (length, weight, volume and temperature)
1.2 Selecting and carrying out calculations	♦ add and subtract numbers given to two decimal places ♦ multiply or divide a number given to two decimal places by a single-digit whole number ♦ multiply or divide a number given to two decimal places by multiples of 10, 100 and 1000 ♦ round answers to the nearest significant figure or three decimal places ♦ find percentages and fractions of shapes and quantities ♦ recognise and use mixed fractions, eg 3½, ⅓, 4¼, 1/8, 2/6 ♦ add and subtract simple fractions, eg ½ + ¼ and ⅔ - ⅓ ♦ find the number of fractional parts in a mixed number, eg 2½ = 5 halves ♦ calculate compound percentage increase and decrease

	♦ express a quantity as a percentage of another quantity ♦ convert equivalences between fractions, decimal fractions and percentages ♦ calculate speed, time and distance ♦ calculate volume (cylinder, triangular prism), area (triangles and composite shapes) and perimeter (circumference) ♦ calculate ratio including dimensions from scale drawings, eg scale of 1:10 ♦ calculate direct and indirect proportion
1.3 Recording measurements using a scale on an instrument	To the nearest marked, minor unnumbered division on an instrument for length, weight, volume and temperature
1.4 Interpreting measurements and the results of calculations to make a decision	♦ use appropriate checking methods, eg check sums and estimation ♦ interpret results of measurements involving time, length, weight, volume and temperature ♦ recognise the inter-relationship between units in the different families ♦ use vocabulary associated with measurement to make comparisons for length, weight, volume and temperature
1.5 Justifying decisions using the results of measurements or calculations	Using evidence from the results of calculations to justify decisions
Outcome 2: Interpret graphical data and situations involving probability to solve real-life problems involving money/time/measurement	
2.1 Extracting and interpreting data from at least three different graphical forms	♦ a table with at least five categories of information ♦ a chart where all the values are not given or where the scale is not obvious, eg comparative/compound bar chart ♦ a graph where part of the axis is missing or the scale is not obvious, eg conversion line graph ♦ a diagram, eg stem and leaf, scatter diagram or a map
2.2 Making and justifying decisions using evidence from the interpretation of data	♦ make decisions based on patterns, trends or relationships in data ♦ using evidence from the interpretation of data to justify decisions ♦ understand the effects of bias and sample size
2.3 Making and justifying decisions based on probability	♦ recognising patterns, trends and relationships and use these to state the probability of an event happening ♦ using evidence from the interpretation of probability to justify decisions ♦ analysing the probability of combined events, identifying the effects of bias and describing probability through the use of percentages,

	fractions, decimal fractions and ratio to make and justify decisions

Content and contexts which are used in the teaching of this Unit are at the discretion of the centre. Content and contexts must however, provide evidence of all Outcomes and Assessment Standards in the Unit.

At National 5, problems should involve a range of contexts drawing from personal, social and vocational areas. These contexts may be unfamiliar to learners. A more analytical approach is expected at this level with problems typically involving sustained calculations and multiple steps. Learners at this level are likely to be more independent, but may rely on the use of calculators and other forms of technology to speed up numerical process, allowing them to focus on analysis and interpretation. Additional supporting material may also be required to support learners' interpretation of the problem.

If this Unit is being delivered on a free-standing basis, teachers and lecturers are free to select the skills, knowledge, understanding and contexts which are most appropriate for delivery in their centres.

Progression from this Unit

This Unit may provide progression to:

- Core Skills: Numeracy (SCQF level 6)
- other Units within the National 5 Lifeskills Mathematics Course
- further study, employment and/or training

Numeracy has applications in a variety of subject areas including life and work. The skills, knowledge and understanding developed in this Unit could support both breadth and depth of learning in other curriculum areas in addition to life and work contexts.

The Numeracy Unit at National 5 is in a hierarchy with the Numeracy Unit at National 4 and National 3. This hierarchical structure aims to facilitate progression and provide a mechanism for learners to be given recognition for their best achievement. This hierarchical relationship and skills development across the levels is shown in Appendix 1.

Approaches to learning and teaching

The purpose of this section is to provide general advice and guidance on approaches to learning and teaching for this Unit.

There are a variety of learning and teaching approaches which can be used to deliver this Unit. This section of the Unit Support Notes provides advice and guidance and includes examples of some approaches that could be used.

The advice and guidance in this section has been developed for a range of educational settings. Teachers/lecturers should use their professional judgement and opportunities for personalisation and choice when designing and delivering the Unit so that it is relevant and motivating for learners.

Effective learning and teaching will draw on a variety of approaches to enrich the experience of learners. In particular, a mix of approaches which provide opportunities for personalisation and choice will help to motivate and challenge learners. Some of these approaches include: interdisciplinary learning; cross curricular opportunities; investigations/problem solving; individual and collaborative work and resource-based learning.

Examples of these approaches for this Unit are outlined below:

Interdisciplinary learning: could be used to develop numeracy through scheduled or special events which take place throughout the year, for example:

- Trade fairs or fund raising events could involve learners using numerical skills to solve real-life problems involving money and data. For example, collecting, recording and interpreting data about money pledged and collected. Learners could be asked to calculate the amount of profit/loss or offset expenditure against money collected. Notions of probability could be discussed in terms of the number of fund raising participants and expected amounts of money to be raised. Learners could use their knowledge of probability to decide whether events should run in the future and justify this decision with evidence from their calculations.
- Shows, exhibitions and plays could be used as contexts to manage money collected from ticket sales and working out the costs of production. Learners could also be involved in managing the timing of events by using appropriate timing devices.
- Sports days could be used to collect and manage data. Sports results could be interpreted and a commentary incorporated as part of a write up following the event. The data could be used to compare achievements and decisions made as to who should win prizes. Justification for prizes could be based on the data collected.
- Visiting speakers or external visits could highlight where and how numeracy is applied in the workplace. This could include retail outlets, construction companies and energy providers. Learners could be asked to participate in a range of calculations typically used in workplace situations.
- School trips, excursions, voluntary work or work experience opportunities could be used to apply numerical skills in contexts such as outdoor education centres, visits to museums, and work attachments to local companies.

Learners could be asked to participate in a range of calculations used in these situations.

Cross curricular opportunities: topics, themes or team teaching could be used to build on the strong relationship between numeracy and other curriculum areas. The examples below could also be adapted for use in other curriculum areas as opportunities to develop numeracy across learning:

Curriculum area	Possible cross-curricular learning and teaching links
Technologies	♦ Applying skills and knowledge of measurement and units of measurement, measuring and marking out materials in accordance with working drawings. Simple formulae could be introduced. ♦ Reading and interpreting scales on instruments and carrying out associated calculations to design and make items, or to work with tools. ♦ Interpreting and calculating dimensions and scale in drawings/diagrams/orthographic projections and applying them to work pieces. ♦ Manufacturing items to given measurements of tolerances and accuracy. ♦ Managing the timing of practical tasks to deadlines
Art	♦ Using knowledge of measurement to create pictures or patterns.
Geography	♦ Using numeracy on field trips or when working with maps and plans. ♦ Learners could take measurements, carry out a range of calculations associated with measurement and interpret a range of graphical data such as weather charts, maps or plans. ♦ When measuring distance, scale will be used, which may also allow for the use of ratios. Simple formulae could be introduced when for example, calculating speed, time and distance ♦ Learners may also be asked to consider percentage or fractional amounts of land taken up for particular purposes, eg housing, industry or recreation. Ratio and proportion could also be explored ♦ Learners could also be involved in measuring or observing and recording information. For example, measuring the volume of tank, collecting field samples or calculating the height of a tree. The effects of bias and sample size could be discussed

Health and wellbeing	♦ Using a range of measuring instruments such as scales, measuring jugs, timers and thermometers during cooking or when preparing food. ♦ Learners could also carry out a range of calculations when using recipes or when calculating ratio and proportion for ingredients. ♦ Calculations could also be used to work out percentage dietary requirements and understand food labelling. Decisions could be made to redress imbalances in diet or exercise. ♦ Learners could also work with a range lifestyle statistics presented in different ways, appreciating the effects of potential bias, to make choices associated with their own health and wellbeing. ♦ Undertaking a basic costing exercise to compare issues surrounding fresh versus convenience foods, or sourcing foods locally in season versus buying food attracting air miles.
Sciences	♦ Measuring and recording data collected during practical scientific experiments, learners could explore how data can be presented in different ways. ♦ Learners could be asked to carry out calculations associated with data and interpret data to make decisions based on the results of these calculations and understanding the results. This could include discussing the possibility of bias and the impact of sample size on the reliability of the data. ♦ Science also involves an awareness and understanding of probability and the chance of events happening such as the probability of combined events.
Physical education	♦ Measuring physical achievements, recording and reporting results to others in graphical form. ♦ Learners could also combine their knowledge of numeracy, geography and physical education in orienteering activities to make decisions associated with speed, time and distance.
Social studies	♦ Exploring the use of numeracy in business. Learners could be involved in an enterprise activity and have the opportunity to develop numerical skills associated with money and money management. Learners could use scenarios to calculate profit and loss and identify trends in sales. ♦ Learners could extract numerical information which will enable decisions to be taken in business. For example, identify trends in customer numbers to

	devise a duty rota or stocking schedule.

Investigative/problem solving approaches may provide the opportunity for learners to observe, explore, experiment and discuss numerical approaches to solve real-life problems. For example, by asking 'what would happen if….?, learners could explore the concepts of probability, bias, sample size and reliability in data. This approach has the potential to stimulate thinking and develop the ability to identify strategies to solve numerical problems. This approach could be supported by questioning and/or discussion by using prompt questions such as: 'What did you do to work that out? Could this task or problem have been solved in a different way? If yes, what would you have done differently?

Individual and/or collaborative working could provide learners with the opportunity to 'think, pair, share' strategies for tackling real-life tasks. For example:

- Learners could be asked to work out how to solve a given problem. They could then share their ideas with others and agree on the best approach.
- Online tests, textbook exercises, quizzes or competitions could also be used to practise numerical skills and strategies, sharpen recall of number facts and develop efficient calculation strategies.
- Exposition is an important technique. However, learners should be engaged as much as possible. The engagement of learners working on their own could be enhanced by teachers/lecturers providing opportunities for personalisation and choice where appropriate.

Group work approaches can be used within Units and across Courses where it is helpful to stimulate real life situations, share tasks and promote team working skills. However, there must be clear evidence to show that the learner has met the required assessment standards for the Unit or Course.

Resource-based learning could include, for example:

- Using real-life or simulated environments to develop skills in money, time and measurement.
- Using calculators, computers, tablets, mobile phones and other electronic devices to explore larger numbers, manage time, or check answers to complex calculations. The use of technology is particularly appropriate when this is a naturally occurring feature of the context in which learning is taking place. Calculators often help learners to process numbers, freeing up time for them to analyse situations, draw conclusions and make informed decisions. However, learners should where possible be encouraged to develop and improve their skills in completing both written and mental calculations to develop numerical fluency and efficiency.
- Using real-life materials such as government publications, extracts from company spreadsheets, invoices, magazine articles, bills, leaflets and adverts.

Combining and sequencing the delivery of Outcomes within the Unit

The combination of delivery and assessment of this Unit is entirely at the discretion of the centre. Two main approaches are suggested here, but other possibilities exist:

Possible combinations	Suggested approaches
Outcomes 1 and 2 combined	In this approach, Outcomes 1 and 2 could be combined. Learners could be given the opportunity to use numerical skills to interpret graphical data and situations involving probability. This could involve learners selecting and using numerical notation, units, and calculations to manipulate and interpret data. Learners could also use the results of calculations to make and justify decisions based on the interpretation of data. Assessment evidence could be collected at the end of the Unit.
Outcomes 1 and 2 sequentially	In this approach, the two Outcomes could be delivered sequentially and in any order. This approach would allow for the development of number and number processing skills which can then be further developed and applied within Outcome 2. In this way numerical skills are reinforced and consolidated. Assessment evidence could be collected at the end of the Unit or during the delivery of each Outcome.

The National 5 Lifeskills Mathematics *Course Support Notes* provide further advice and guidance on generic approaches to learning and teaching which apply to all component Units of the Course.

Examples of possible contexts for the learning and teaching of Numeracy can be found in Appendix 2.

Developing skills for learning, skills for life and skills for work

This Unit overtakes the requirements of Numeracy as described in SQA's *Skills for Learning, Skills for Life and Skills for Work* framework.

There are also significant opportunities to develop the following thinking skills as described in the table below:

SQA skills for learning, skills for life and skills for work framework definition	Suggested approaches for learning and teaching
Applying is the ability to use existing information to solve a problem in a different context, and to plan, organise and complete a task.	Wherever possible, learners could be given the opportunity to apply the skills, knowledge and understanding they have developed to solve mathematical problems in a range of real-life contexts. Learners could be encouraged to think about how they are going to tackle problems, decide which skills to use and then carry out the calculations in order to complete the task. To determine a learner's level of understanding, learners could be encouraged to show and explain their thinking.
Analysing and evaluating is the ability to identify and weigh up the features of a situation or issue and to use your judgement of them in coming to a conclusion. It includes reviewing and considering any potential solutions.	Wherever possible, learners could be given the opportunity to identify real-life tasks or situations which require the use of numeracy. Learners could be encouraged to analyse the task or situation to decide how it can be addressed and what numerical skills will need to be applied. Learners could be given the opportunity to interpret the results of their calculations and to draw conclusions. Conclusions drawn by the learner should be used to form the basis of any reasoning demonstrated by making and justifying choices or decisions to solve a given problem. Aspects of probability may provide appropriate opportunities for analysis and evaluation.

There may also be further opportunities for the development of additional skills for learning, skills for life and skills for work in the delivery of this Unit. These opportunities may vary and are at the discretion of the centre.

Approaches to assessment

The purpose of this section is to give advice and guidance on approaches to assessment within this Unit.

A variety of approaches can be used to assess learners and gather evidence. The examples given here are not exhaustive.

Assessments must be valid, reliable and fit for purpose for the subject and should fit with the learning and teaching approaches adopted. Each assessment should therefore:

- be designed to allow learners to produce sufficient evidence to show they have achieved the required Outcomes and Assessment Standards for the Unit
- allow consistent judgements to be made
- be appropriate for the general aims of the Unit

Combining and sequencing the assessment of Outcomes within the Unit

The combination of delivery and assessment of this Unit is entirely at the discretion of the centre.

The pattern of combined assessment can mirror that for integrated delivery as suggested in the section on 'Approaches to learning and teaching'.

A combined approach to assessment has the advantage of:

- bringing together elements of different Outcomes and encouraging the transfer of skills, knowledge and understanding
- making learning and assessment more coherent and relevant for learners

Suggested approaches to assessment
The skills-based focus of the Unit readily lends itself to a variety of approaches to assessment.

The following table gives some suggested approaches to assessment and examples of how they could be used to combine assessment within the Unit.

Suggested assessment approach	**An example of how this approach could be used to combine assessment of Outcomes and Assessment Standards within the Unit**
Problem solving tasks or activities	**Example 1**: Based on a savings account with a given interest rate, calculate annual compound interest over three years. Given a decrease in the interest rate, calculate the corresponding reduction in savings. **Example 2**: Based on a set of utility bills for a household over the period of a year, calculate the total cost per year, adding VAT at 20%. Calculate the total cost of the

	utilities per month as part of a household budget.
Projects or Investigations	**Example 1**: Use travel brochures to plan a holiday to a foreign destination. Work out travel arrangements and costs along with and hotel costs for a five day stay. Calculate spending money and work out how much local currency will be given in exchange for sterling. **Example 2**: Investigate savings rates offered by a variety of banks and building societies and work out interest gained over a period of time. Learners could also investigate the effects of interest rates on borrowing.
Case Studies	**Example 1**: Using given data showing the variable costs for gym packages, work out the monthly subscription costs and additional costs for classes. Decide which package is affordable based on a given budget. **Example 2**: Based on given data for an events management company, learners could be asked to work out a duty rota for a number of staff to cover food preparation, setting tables, waiting on tables and kitchen cleaning.
Short/extended response tests	Short and extended response tests could be used to assess both Outcomes at the same time. Tests should build up in difficulty starting with simple short response questions at the start and finishing with more challenging extended response questions. Short response questions could be used to assess those Assessment Standards which focus on processing such as selecting and carrying out calculations and extracting and interpreting data. Extended response questions would lend themselves to the assessment of the reasoning, such as 'Making and justifying decisions based on the results of measurements and calculations' and 'Making and justifying decisions based on probability'. Learner's justification could be demonstrated by using the results of calculations and/or measurements.

Additional examples are provided in Appendix 2 'Examples of learning and teaching contexts'.

Whatever assessment method is used, teachers/lecturers are encouraged to be as inclusive as possible taking into account the needs and experiences of their learners. In particular, internal assessment should:

- use content, resources and materials that recognise different groups and avoid bias or stereotyping
- where possible, provide a balance of assessment methods and adopt alternative approaches to gather evidence which build in opportunities for personalisation and choice

Evidence must be generated for all Outcomes and Assessment Standards.

Exemplification of assessment is provided in the *National Assessment Resource*.

Gathering evidence

Evidence for assessment purposes could take a variety of forms such as:

- written evidence including calculations and graphics generated during
- supervised class work or discrete mathematical tests
- oral evidence arising from discussion between learners and the teacher which shows learners' ability and understanding across the Assessment Standard
- computer-generated assessment records or printouts from simulations, eg SQA Solar or online tests
- photographs of project or investigative work
- a product which could be a spreadsheet or computer-generated graphic

This list is not exhaustive and other types of evidence are also possible.

Achievement is on a pass/fail basis for the Outcomes. Learners who fail to achieve all of the Assessment Standards within the Outcomes will only need to be re-assessed on those Assessment Standards not achieved. Centres may consider it appropriate to delay re-assessment until further learning has taken place. Opportunities may exist for this by building reassessment into assessment carried out in other Units.

Authentication

For guidance on authentication of evidence which is gathered outwith the direct supervision of the teacher/lecturer responsible for the learner, eg outside the school or classroom, refer to SQA's *Guide to Assessment.*

Equality and inclusion

It is important that where possible, inclusive approaches to learning and assessment encourage personalisation and choice for learners. The additional support needs of learners should also be taken into account when planning learning experiences and when considering any reasonable adjustments that may be required.

Any additional support provided to learners to help them access assessment tasks should maintain the integrity of the Outcomes and Assessment Standards.

Examples of support which may be appropriate for this Course are as follows:

- practical helpers under direct learner instruction could assist with practical measurement activities (including a reader or scribe)
- adapted equipment would also be appropriate for measuring tasks
- the use of a calculator or similar aid
- ICT and other assistive technologies

Other types of support are also possible and would be determined by the teacher/lecturer in response to the specific needs of the learner.

It is recognised that centres have their own duties under equality and other legislation and policy initiatives. The guidance given in these *Unit Support Notes* is designed to sit alongside these duties but is specific to the delivery and assessment of the Unit.

Alternative approaches to Unit assessment to take account of the specific needs of learners can be used. However, the centre must be satisfied that the integrity of the assessment is maintained and that the alternative approach to assessment will, in fact, generate the necessary evidence of achievement.

Appendix 1: Reference documents

The following reference documents will provide useful information and background.

- Assessment Arrangements (for disabled candidates and/or those with additional support needs) — various publications on SQA's website: http://www.sqa.org.uk/sqa/14976.html
- Building the Curriculum 4: Skills for learning, skills for life and skills for work
- Building the Curriculum 5: A framework for assessment
- Course Specifications
- Design Principles for National Courses
- Guide to Assessment (June 2008)
- Overview of Qualification Reports
- *Principles and practice papers for curriculum areas*
- *Research Report 4 — Less is More: Good Practice in Reducing Assessment Time*
- *Coursework Authenticity — a Guide for Teachers and Lecturers*
- SCQF Handbook: User Guide *(published 2009)* and SCQF level descriptors (to be reviewed during 2011 to 2012): www.sqa.org.uk/sqa/4595.html
- SQA Skills Framework: Skills for Learning, Skills for Life and Skills for Work
- Skills for Learning, Skills for Life and Skills for Work: Using the Curriculum Tool
- SQA Guidelines on e-assessment for Schools
- SQA Guidelines on Online Assessment for Further Education
- SQA e-assessment web page: www.sqa.org.uk/sqa/5606.html

Appendix 2: Hierarchical progression

Numeracy (National 3)	Numeracy (National 4)	Numeracy (National 5)
At National 3, problems should be simple and involve contexts that are familiar and relevant to the daily life of the learner. Problems should be clear and involve only 1 or 2 steps. It is likely that learners at this level will require support to interpret the problem.	At National 4, problems should involve straightforward contexts that frequently occur in daily life and are likely to be familiar to the learner. Problems should be clear and typically involve 2 – 3 operations. They are likely to involve more than 2 steps. Learners at this level may require additional support materials to interpret the problem.	At National 5, problems should involve a range of contexts drawing from personal, social and vocational areas. These contexts may be unfamiliar to learners. A more analytical approach is expected at this level with problems typically involving sustained calculations and multiple steps. Learners at this level are likely to be more independent, but may rely on the use of calculators and other forms of technology to speed up numerical process and allowing them to focus on analysis and interpretation. Additional supporting material may also be required to support learners' to interpret the problem
Outcome 1: Use numerical skills to solve simple, real-life problems involving money/time/measurement	**Outcome 1: Use numerical skills to solve straightforward, real-life problems involving money/time/measurement**	**Outcome 1: Use numerical skills to solve real-life problems involving money/time/measurement**
1.1 Selecting and using appropriate numerical notation and units: ♦ =, +, –, ×, /, ÷, and decimal point ♦ Units: — money (pounds and pence) — time (months, weeks, days, hours, minutes) — measurement of length (millimetre,	1.1 Selecting and using appropriate numerical notation and units ♦ =, +, –, ×, /, ÷, <, >, ( ), %, colon and decimal point ♦ Units: — money (pounds and pence) — time (months, weeks, days, hours, minutes, seconds)	1.1 Selecting and using appropriate numerical notation and units ♦ =, +, -, x, /, ÷, <, >, ( ), %, colon and decimal point and simple formulae ♦ Units: — money (pounds and pence) — time (months, weeks, days, hours, minutes, seconds)

centimetre, metre, kilometre); weight (gram, kilogram); volume (millilitre, litre) and temperature (Celsius)	— measurement of length (millimetre, centimetre, metre, kilometre, mile); weight (gram, kilogram); volume (millilitre, litre) and temperature (Celsius or Fahrenheit)	— measurement of length (millimetre, centimetre, metre, kilometre, mile); weight (gram, kilogram); volume (millilitre, litre) and temperature (Celsius and Fahrenheit)
1.2 Selecting and carrying out calculations such as: ♦ add and subtract whole numbers to four digits ♦ multiply to four-digit whole numbers with one or two digit whole numbers ♦ divide to four-digit whole numbers with a single digit whole number ♦ round answers to two decimal places ♦ use simple percentages and fractions eg 50%, 10%, 20% and 25%; ½, ¼, 1/10, 1/5 ♦ express numbers up to 10,000 ♦ convert between simple fractions, decimal fractions and percentages	1.2 Selecting and carrying out calculations: ♦ add and subtract whole numbers including negative numbers ♦ multiply whole numbers of any size, with up to four-digit whole numbers ♦ divide whole numbers of any size, by a single digit whole number as well as 10 and 100 ♦ round answers to the nearest significant figure or two decimal places ♦ find simple percentages and fractions of shapes and quantities, eg 50%, 10%, 20% and 25%, 33⅓%; ½, ⅓, ¼, 1/10, 1/5 ♦ calculate percentage increase and decrease ♦ convert equivalences between common fractions, decimal fractions and percentages ♦ calculate rate: eg km per hour or number of texts per month ♦ calculate distance given speed and time	1.2 Selecting and carrying out calculations: ♦ add and subtract numbers given to two decimal places ♦ multiply or divide a number given to two decimal places by a single-digit whole number ♦ multiply or divide a number given to two decimal places by multiples of 10, 100 and 1000 ♦ round answers to the nearest significant figure or three decimal places ♦ find percentages and fractions of shapes and quantities ♦ recognise and use mixed fractions, eg 3½, ⅓, 4¼, 1/8, 2/6 ♦ add and subtract simple fractions, eg ½ + ¼ and ⅔ - ⅓ ♦ find the number of fractional parts in a mixed number, eg 2½ = 5 halves ♦ calculate compound percentage increase and decrease ♦ express a quantity as a percentage of another quantity

	♦ calculate time intervals using the 12 hour and 24-hour clock ♦ calculate volume (cube and cuboid), area (rectangle and square) and perimeter (shapes with straight lines) ♦ calculate ratio and direct proportion	♦ convert equivalences between fractions, decimal fractions and percentages ♦ calculate speed, time and distance ♦ calculate volume (cylinder, triangular prism), area (triangles and composite shapes) and perimeter (circumference) ♦ calculate ratio including dimensions from scale drawings, eg scale of 1:10 ♦ calculate direct and indirect proportion
1.3 Recording measurements using a simple scale on an instrument ♦ measure length, weight, volume and temperature ♦ read scales to the nearest marked, numbered division ♦ Centimetres to be measured to the nearest cm and for small objects, accuracy should be ±2 millimetres.	1.3 Recording measurements using a straightforward scale on an instrument ♦ measure length, weight, volume and temperature ♦ read scales to the nearest marked, unnumbered division	1.3 Recording measurements using a scale on an instrument ♦ measure length, weight, volume and temperature ♦ read scales to the nearest marked, minor, unnumbered division
1.4 Interpreting measurements and the results of calculations ♦ interpret results of measurements involving time, length, weight, volume and temperature ♦ recognise inter-relationship between units of the same family ♦ use vocabulary to make comparisons for length, weight, volume and temperature	1.4 Interpreting measurements and the results of calculations to make decisions ♦ interpret results of measurements involving time, length, weight, volume and temperature ♦ recognise inter-relationship between units in the same family ♦ use vocabulary to make comparisons for length, weight, volume and temperature	1.4 Interpreting measurements and the results of calculations to make decisions ♦ interpret results of measurements involving time, length, weight, volume and temperature ♦ recognise inter-relationship between units different families ♦ use vocabulary associated to make comparisons for length, weight, volume and temperature

1.4 Making decisions based on the results of measurements and calculations ♦ Make simple decisions, an explanation is not required	1.5 Explaining decisions based on the results of measurements and calculations ♦ Give reasons for decisions based on the results of calculations	1.5 Justifying decisions based on the results of measurements and calculations ♦ Using evidence from the results of calculations to justify decisions
Outcome 2: Interpret graphical data, and situations involving probability to solve simple, real-life problems involving money/time/measurement	**Outcome 2: Interpret graphical data, and situations involving probability to solve straightforward, real-life problems involving money/time/measurement**	**Outcome 2 Interpret graphical data, and situations involving probability to solve real-life problems involving money/time/measurement**
2.1 Extracting and interpreting data from at least one simple graphical form. Simple graphical forms should include: ♦ a table with at least three categories of information ♦ a chart such as a bar chart or pictogram ♦ a graph such as a single line graph where the scale is obvious ♦ a diagram such as a 2D plan	2.1 Extracting and interpreting data from at least two different straightforward graphical forms Straightforward graphical forms should include: ♦ a table with at least four categories of information ♦ a chart where the values are given or where the scale is obvious, eg pie ♦ a graph where the scale is obvious, eg bar, pie, scatter or line graph ♦ a diagram, eg stem and leaf, map or plan	2.1 Extracting and interpreting data from at least three different graphical forms ♦ a table with at least five categories of information ♦ a chart where all the values are not given or where the scale is not obvious, eg comparative/compound bar chart ♦ a graph where part of the axis is missing or the scale is not obvious, eg conversion line graph ♦ a diagram, eg stem and leaf, scatter diagram or a map

2.2 Making decisions based on the interpretation of data ♦ make decisions based on calculations ♦ make decisions based on reading scales	2.2 Making and explaining decisions based on the interpretation of data from straightforward graphical forms: ♦ make decisions based on calculations ♦ make decisions based on reading scales ♦ offer reasons for decisions made based on the interpretation of data	2.2 Making and justifying decisions using evidence from the interpretation of data from graphical forms ♦ make decisions based on patterns, trends or relationships in data ♦ using evidence from the interpretation of data to justify decisions ♦ understand the effects of bias and sample size
2.3 Making decisions based on probability ♦ use data to state likelihood of an event happening ♦ make decisions based on likelihood	2.3 Making and explaining decisions based on probability ♦ make predictions and use these predictions to make and explain decisions	2.3 Making and justifying decisions based on probability ♦ recognising patterns, trends and relationships and use these to state the probability of an event happening ♦ using evidence from the interpretation of probability to justify decisions ♦ analysing the probability of combined events, identifying the effects of bias and describing probability through the use of percentages, fractions decimal fractions and ratio to make and justify decisions

Appendix 3: Examples of learning and teaching contexts

Outcome 1: The learner will use numerical skills to solve real-life problems involving money/time/measurement.

1 Using recipes to carry out measurements involving weight, capacity and temperature. All measurements should be metric.

2 Applying ratio and proportion to make a proper mix of mortar for a building project, eg one bucket of cement to one bucket of lime to five buckets of sand.

3 Given one year's income and tax rates, calculate the income tax due for the year.

4 Based on a savings account with a given interest rate, calculate annual compound interest over three years. Given a decrease in the interest rate, calculate the corresponding reduction in savings.

5 Using a utility bill calculate, for example, average costs per day, discounts, VAT at 20% and costs if usage is increased by 15% each month.

6 Calculating income and expenditure for a shop using monthly accounts.

7 Measuring up and costing materials required to landscape a garden.

8 Given the amount of gas used per week and the cost per unit, estimate the annual cost of gas for a household.

9 Comparing the fuel consumption of a range of cars, given the mileage per litre.

10 Given the appropriate tables/charts and figures:

- Calculate how much money has been made from the number 1 singles in the past year.
- Calculate how much the artists or groups have made compared to the manufacturer.
- Calculate which artists have made the most money in a year.
- Calculate the percentage that the performer receives, compared to the recording company and the government.

11 Look up the latest Scottish football tables and answer questions similar to the following:

- Which team has the highest average score per match played?
- What proportion of goals are scored at home compared with away?
- What percentage of goals have been scored by the five top teams?

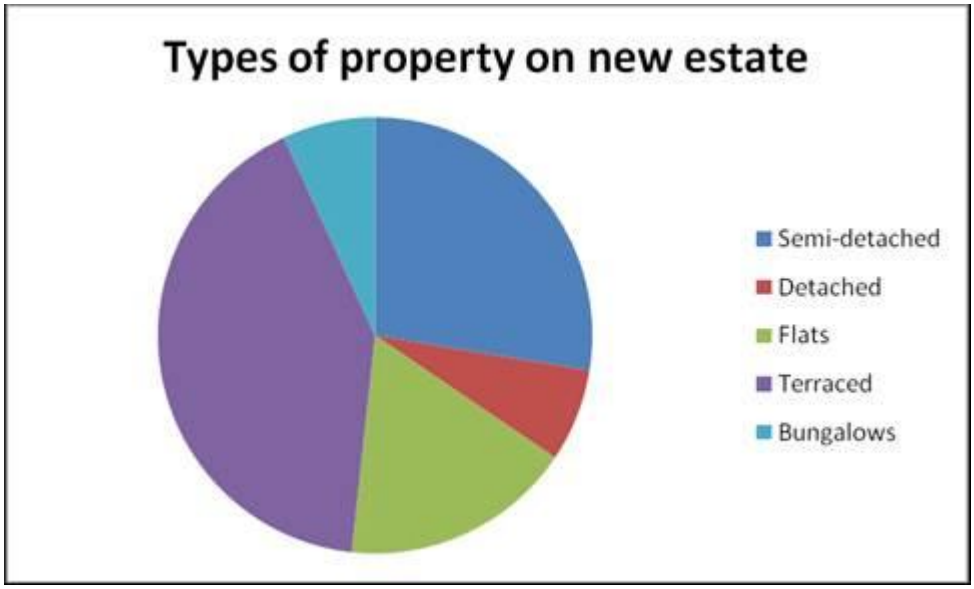
Outcome 2: The learner will interpret graphical data and situations involving probability to solve real-life problems involving money/time/measurement.

1 From a table such as shown below, learners should be able to extract and interpret data to determine the cost of insurance for a family with varying numbers of nights, destinations and families with a variety of age ranges. Learners should also be able to discuss and make decisions relating to the cost of the travel insurance options within a given budget for different sizes of families while considering travel within and outside Europe. Learners should also be able to explain and make decisions about whether the whole family can afford to travel and risk-assess whether they can afford the insurance provisions and whether, for example, they can afford to take elderly family members.

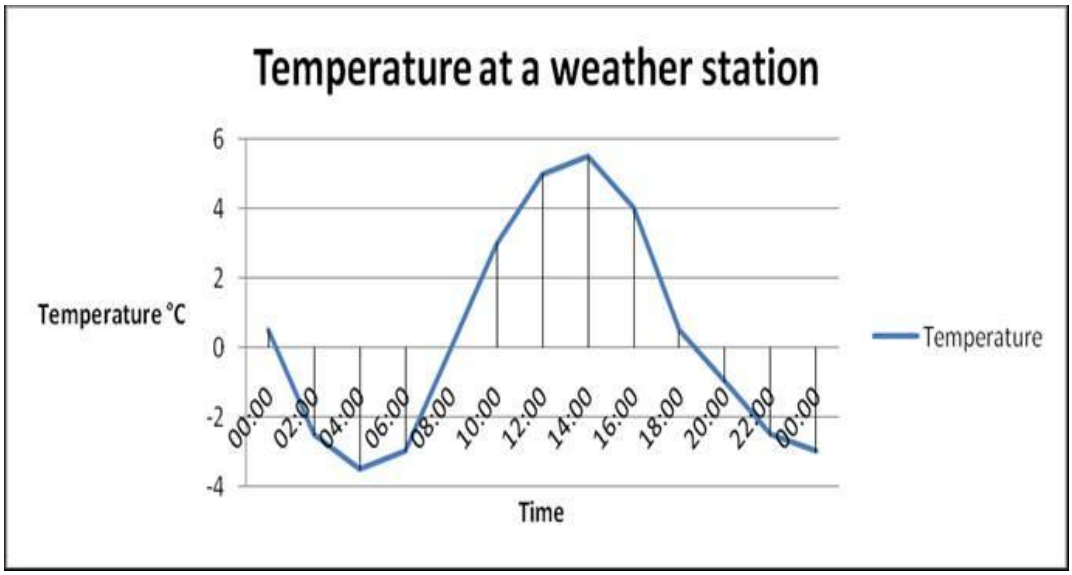
Age	**2–15 years**		**16–64 years**		**65 or over**	
Number of nights	Europe	Outside Europe	Europe	Outside Europe	Europe	Outside Europe
6–9	£18.20	£33.90	£24.30	£44.50	£30.60	£55.25
10–17	£21.80	£38.25	£28.40	£51.20	£35.25	£63.75
18–23	£24.75	£42.50	£33.20	£56.25	£41.75	£70.50

2 Using a compound bar chart such as the example shown below, learners should be able to extract and interpret data, calculate the amount of commission and or bonus earned and identify which employee earned most commission. They should also be able to discuss and make decisions about the company threshold for bonus pay. Learners could also discuss and make decisions about the probability of who could be a candidate for employee of the week.

3 From a pie chart such as this, learners should be able to extract and interpret data. They should, for example, be able to identify the number of each type of property given the total number under development. They should also be able to make decisions on the types of marketing strategies which might be suitable for each type of property.



4 From a line graph such as this, students should be able to extract and interpret data. Learners should be able to, for example, estimate the temperature at any time of the day. They should also be able to make decisions on temperature trends and make decisions on different heating strategies which might be suitable for their homes or offices.



Administrative information

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Superclass: to be advised

History of changes to Unit Support Notes

Unit details	Version	Description of change	Authorised by	Date