ColegauCymru
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Essential Skills Wales Suite

Implementation, Delivery and Assessment Guidance for Practitioners, Assessors and Learners

Essential Application of Number Skills

Acknowledgements

This document was developed as part of a wider project funded by Welsh Government (WG) to prepare and support practitioners to deliver the new ESW Suite of qualifications. This document was produced by ColegauCymru, working with WG and Awarding Bodies to ensure coherence and consistency.

It is intended that it is used in conjunction with Awarding Bodies' 'ESW Suite of Qualifications Handbook' to ensure that practitioners are aware of regulatory requirements as well as those associated with effective delivery. Please note that for assessment and qualification achievement purposes, any requirements in the Awarding Bodies 'ESW Suite of Qualifications Handbook' take precedence.

All information contained in this guidance is correct at time of publishing.

Essential Skills Wales Suite: implementation, delivery and assessment guidance for practitioners, assessors and learners

Audience

- Practitioners and assessors delivering qualifications within the Essential Skills Wales Suite from September 2015 (the qualifications)
- Individuals conducting internal and external quality assurance of the qualifications
- Learners undertaking any or all of the qualifications.

Overview

This document:

- **Should be read in conjunction with the Awarding Bodies' 'ESW Suite of Qualifications Handbook'**
- provides information and guidance relating to the rationale for the qualifications and outlines their characteristics
- includes subject-specific (Essential Application of Number Skills, Essential Communication Skills, Essential Digital Literacy Skills and Essential Employability Skills) guidance on assessment and access requirements for those involved in implementing and/or quality assuring the qualifications
- incorporates guidance for learners which reflects the purpose and relevance of the qualifications in education and work-based contexts and explains assessment requirements.

Action required

Practitioners, assessors and individuals conducting internal and external quality assurance roles can use the relevant ESW qualification document to inform and guide implementation, delivery and quality assurance to meet policy and specification requirements.

Learners can use this guidance to help them achieve the qualifications. It is however appropriate for learners at Entry Level and on L1 programmes to be assisted in interpreting and using this guidance.

Guidance Documents available are:

- Essential Application of Number Skills
- Essential Communication Skills
- Essential Digital Literacy Skills
- Essential Employability Skills

Contents

Introduction

This document provides key information and guidance to assist the effective delivery, assessment[1] and quality assurance of all qualifications within the Essential Skills Wales Suite implemented from September 2015 (the qualifications). In addition, it provides guidance on the content and assessment of the qualifications specifically for learner reference and use.

The rationale for change is explained, with an overview of common features and assessment requirements applicable across the qualifications. Essential Skill-specific detail is provided outlining assessment requirements at each level. The document also acknowledges that practitioners will be delivering specifications provided by a range of awarding bodies and provides links to their documents.[2]

Essentially, the guidance seeks to assist effective and consistent implementation of the qualification by ensuring that:

- Practitioners have access to clear information on the rationale for and common elements in the qualifications
- Practitioners, assessors, learners and individuals involved in quality assurance of the qualifications are notified of the timescales that apply to implementation and assessment
- Practitioners and assessors are provided with explanation and amplification of assessment requirements across all Essential Skills at each available level
- Individuals involved in the quality assurance of the qualifications are made aware of requirements designed to secure robust standards
- Learners have useful information on the content of the qualifications and how they will be assessed.

The existing Entry Level subject specifications are available from Qualification Wales.

[1] Please refer to the Awarding Bodies' 'ESW Suite of Qualifications Handbook'.
[2] Please refer to the Awarding Bodies' 'ESW Suite of Qualifications Handbook'.

Rationale

The availability of a range of qualifications to promote effective acquisition of skills for application in education, work and life is fundamental to successful implementation of the skills agenda in Wales.

In 2010, Key and Basic Skills qualifications were superseded by Essential Skills Wales (ESW), which established a coherent suite of qualifications and standards to enable progression from Entry Level 1 to level 4. Communication, Application of Number and Information and Communication Technology qualifications were complemented by Wider Key Skills (Working with Others, Improving Own Learning and Performance and Problem Solving) to provide a balanced and comprehensive offer supporting development of skills in learning, employment and life contexts.

In September 2015 ESW qualifications and Wider Key Skills were replaced by a new suite of Essential Skills, established in response to the recommendations of the Review of Qualifications (2012).
http://gov.wales/docs/dcells/publications/121127reviewofqualificationsen.pdf

The Essential Skills Wales Suite (the qualifications) incorporate:

- Essential Application of Number Skills (EAoNS)
- Essential Communication Skills (ECommS)
- Essential Digital Literacy Skills (EDLS)
- Essential Employability Skills (EES)

The Review of Qualifications recommendations proposed revised and more reliable assessment for Communication and Application of Number (R27), establishing a new skill qualification (Digital Literacy to replace ICT: R28), and the incorporation of new Essential Employability Skills within the Suite. In essence, recommendations from the review have been instrumental in shaping the qualifications to ensure greater clarity, relevance and reliability within the following skills:

- Communication
- Application of Number
- Digital Literacy
- Critical Thinking and Problem Solving
- Planning and Organisation
- Creativity and Innovation
- Personal Effectiveness

A further recommendation proposed that Essential Skills Wales qualifications should no longer be delivered to learners aged between 14 and 16. This was because schools reported difficulties in generating evidence for qualifications that had been designed primarily for other learning contexts. The new GCSEs within the Welsh Baccalaureate will be used to assess literacy and numeracy in 14-16 year olds.

Exceptions to this are:

- 14-16 learners will be able to undertake ES qualifications at Entry Level
- 14-16 learners in alternative settings will be able to access ES qualifications at all levels

Other recommendations in the Review responded to concerns surrounding the efficiency and effectiveness of portfolio-based assessment, the need for a more systematic and robust approach to marking and assessment and the need to include an element of externality in assessment.

The Qualifications – common features

The qualifications reflect several common features, reinforcing the key themes that contributed to their development. In response to the need for learners to develop and consolidate skills coherently, clear progression pathways have been established across the qualifications. All are offered from Entry 1 to Level 3, with the exception of Essential Employability Skills which is available from Entry 3 to Level 3.

All qualifications share the common aim that learners acquire relevant skills valued by employers and next-stage educators and, furthermore, that they are able to demonstrate proficiency in their application. Common aims[3] are to:

- structure and consolidate learning, making incidental, naturally occurring, practices explicit
- encourage articulation, analysis of and reflection on the skills and on learner's own proficiency in them, in personalised terms
- increase confidence and effectiveness in the use and application of these skills
- develop an understanding of how to transfer skills to new purposes and contexts
- provide positive and engaging opportunities to further explore, develop, practise and apply the skills, in a range of meaningful and 'real-life' contexts for real-life purposes.

In addition - common to all of the qualifications - is a more rigorous approach to achieving the standards through clear, purposeful assessment of all skills and robust quality assurance.

[3] Please refer to the Awarding Bodies' 'ESW Suite of Qualifications Handbook' 4.1

Assessment[4]

To ensure that the qualifications provide an effective learning experience, assessment will be externally set by awarding bodies and undertaken through a combination of formal **summative** methods, as applicable to each skill. These are the **Controlled Task, Confirmatory Test** and **Structured Discussion.**

In order to achieve the qualification in ***Essential Application of Number Skills*** and ***Essential Communication Skills*** at Levels 1, 2 or 3, learners must demonstrate their skills in **both a Controlled Task and a** short **Confirmatory Test.**

In order to achieve the qualification in ***Essential Digital Literacy Skills*** and ***Essential Employability Skills***, learners must demonstrate their skills in **both** a **Controlled Task** and a short **Structured Discussion.**

The **Controlled Task** measures subject-specific skills and learners must demonstrate that they can use skills in a holistic manner, relevant to real-life circumstances.

Controlled Tasks[5] are:

- externally set (or approved) by an awarding body
- presented unseen to learners and completed under controlled conditions
- internally assessed by centres, using marking criteria provided
- internally quality assured by centres
- moderated/externally quality assured by the awarding body.

The Task must be completed under controlled conditions within a maximum of a consecutive eight-week period. Guidance on the Controlled Task environment/conditions is outlined in the Awarding Bodies 'ESW Suite of Qualifications Handbook'.

Learners will be provided with most of the source material required to complete a Controlled Task. Any additional **supervised** research required for a particular Controlled Task may take place outside of the maximum number of allocated hours, but **must** be within the consecutive eight-week period[5].

Controlled Task duration will differ in relation to level and/or skill:

- up to 6 hours at Entry Level (for EDLS and EES)
- up to 4 hours for Level 1
- up to 5 hours for Level 2
- up to 8 hours for Level 3

[4] Please refer to the Awarding Bodies' 'ESW Suite of Qualifications Handbook' 4.1
[5] Please refer to the Awarding Bodies' 'ESW Suite of Qualifications Handbook' 4.3

Additional time may be allowed if extenuating circumstances apply. Organisations must refer to awarding bodies for information and agree special arrangements with the awarding body whose qualifications are being delivered. This must be undertaken prior to the learner starting the Task[6].

The purpose of the **Confirmatory Test** and **Structured Discussion** is to confirm learners' underpinning knowledge and skills.

Confirmatory Tests are:

- intended as a summative assessment of a learner's knowledge
- taken after successful completion of the relevant Controlled Task
- not to be taken at the start of a course or before it has been established that a learner has all of the required skills
- externally produced by awarding bodies
- treated as confidential material by centres
- taken unseen by learners and completed unaided (other than where assistance is allowed under the Access Guidance)
- externally marked
- compliant with guidance provided by the relevant awarding body and within relevant sections of this document.

Structured Discussions are:

- one-to-one between learner and assessor
- not question and answer sessions
- carried out following successful completion of the Controlled Task in EDLS
- sometimes appropriate for use as supplementary evidence for a Controlled Task in EES
- related to a learner's response to the Controlled Task
- assessment opportunities that require learner preparation
- recorded in some way.

The Controlled Task, Confirmatory Test and Structured Discussion are **summative assessments**. Learners should undertake the assessments following teaching and learning when they have developed relevant skills at the required level. Learners may undertake a **different** Controlled Task or Confirmatory Test at another time if they do not pass.

The Test should be made accessible to those with particular assessment requirements, without compromising achievement at the required standard. Initial assessment must be used to identify any necessary individual support or adjustments and these must be agreed with the awarding body prior to the test being started by the learner.

[6] Please refer to the Awarding Bodies' 'ESW Suite of Qualifications Handbook' 4.6.1

Further details relating to specific delivery and assessment requirements for each skill at each available level are outlined in subsequent sections of this document.

Quality assurance arrangements must be undertaken in accordance with guidance provided by relevant awarding bodies.[7]

Awarding body regulations must be complied with. These may relate to levels of experience for practitioner, assessor and internal quality assurance staff and expectations in terms of the currency and adequacy of their CPD.[8]

[7] Please refer to the Awarding Bodies 'ESW Suite of Qualifications Handbook' 5.1 / 5.2
[8] Please refer to the Awarding Bodies 'ESW Suite of Qualifications Handbook' 2.2

Essential Application of Number Skills
Amplification of assessment requirements

Levels 1, 2 and 3

These qualifications are about demonstrating skills in:

- understanding numerical data
- carrying out calculations
- interpreting results and presenting findings

in order to tackle problems or tasks that are met in education, training, work and social roles.

Notes:

1. Each level of skill incorporates and builds on the previous level. For example, in N1.2 the requirement to *'multiply and divide a simple decimal by a whole number, with and without a calculator'* builds on *'multiply two-digit whole numbers by single-digit whole numbers'* (Entry Level 3); when carrying out calculations at Level 3, learners need to know how to *'work with, and convert between fractions, decimals and percentages'*, which is a requirement at Level 2.

2. Learners need to show that they can apply their skills in the way they are specified in the first column of the amplification table, headed, **'Learning outcome'**. In order to meet these requirements, learners need to have the skills listed in the second column headed, **'The learner needs to know how to'**. Practitioner / Assessor guidance is provided in the third column headed, **'Practitioner / Assessor guidance'**.

Assessment

Learners will be assessed via a Controlled Task and a short Confirmatory Test to confirm that their skills meet Essential Application of Number Skills Specifications at the required level.

The **Controlled Task** is an activity that covers all three components - N1/2/3.1, N1/2/3.2 and N1/2/3.3 - as a continuous process; it confirms that a learner can utilise their skills in a meaningful way and demonstrate understanding of the whole process.

The **Confirmatory Test** is an externally assessed activity and confirms a learner's underpinning knowledge and skills.

Controlled Task and Confirmatory Test Specification

Introduction

- The Essential Application of Number Skills qualification will be awarded to learners who demonstrate that their skills meet the Specification in both the Controlled Task and the externally assessed Confirmatory Test.
- The Controlled Task measures subject-specific skills that may not necessarily be assessed in the Confirmatory Test.
- Both the Controlled Task and Confirmatory Test are summative. Learners should take these assessments when they have developed the skills at the required level. The pass mark is set at a level to reflect this expectation.

Controlled Task Specification[8]

- Controlled Tasks will be externally set by awarding bodies.
- Controlled Tasks will meet the requirements of the Essential Application of Number Skills Specification.
- A Marking Grid will accompany each Controlled Task, explicitly referencing the assessment requirements and the Specification.
- Controlled conditions will be defined by awarding bodies.

Duration:

- Level 1 - up to 4 hours
- Level 2 - up to 5 hours
- Level 3 - up to 8 hours

The Task is designed to be completed in its entirety within the maximum hours stated for each level. The Task must be completed under controlled conditions within a maximum of a consecutive eight week period.

Confirmatory Test Specification

- The Confirmatory Test must be completed in addition to the Controlled Task.
- All Tests will be based on a common specification. They will consist entirely of fixed-response (multiple choice) items delivered as either an onscreen or paper-based test. Each Test at:
  - Level 1 will involve a maximum of 20 items and is intended to have a maximum duration of approximately 30 minutes.
  - Level 2 will involve a maximum of 20 items and is intended to have a maximum duration of approximately 45 minutes.
  - Level 3 will involve a maximum of 30 items and is intended to have a maximum duration of approximately 60 minutes.

[8] Please refer to the Awarding Bodies 'ESW Suite of Qualifications Handbook'

- Each multiple choice item will have one correct answer, with strong distractors. Each item will be worth one mark.
- Unlike the Controlled Task, the Test may not explicitly assess problem solving capabilities, although the questions will be broadly scenario-based using everyday contexts that are likely to be relevant and engaging to 16+ and adult learners across a wide range of settings.

  Examples of contexts which might provide opportunities to develop suitable questions include:

  - family and home
  - leisure
  - education, training and work
  - community and citizenship
  - media and communications
  - social issues.

- Learners will be expected to demonstrate the resilience necessary to complete the test in one sitting.
- Test materials provided by awarding bodies will be free of any form of bias (for example, gender, ethnicity, or age-related) that might favour or disadvantage any learner or groups of learners.
- All Tests will be conducted under invigilated conditions (in compliance with the requirements of the JCQ ICE or similar). All responses must be generated entirely by the learner without third party assistance with any material aspect of the assessment.
- Calculators must not be used during any of the Essential Application of Number Skills Tests.
- The pass mark for each Test will be set by the awarding bodies following an agreed procedure.

Controlled Task - Essential Application of Number Skills

Controlled Task Specification		
▪ The Task will be designed to assess the three components (N1/2/3.1, N1/2/3.2 and N1/2/3.3) in one integrated task / in reasonably balanced proportions, with between 30 – 40% of the marks allocated to each component; it will engage these areas in coherent, purposeful and applied activities. ▪ When completing the Task, learners ***must show evidence of manual calculations*** - calculators and/or software must not be used to carry out ***all*** calculations.		
Level 1 Plan of Task	**Level 2 Plan of Task**	**Level 3 Plan of Task**
Learners will be required to follow the process below in line with the three skill areas: • What do I want to find out? • How will I do it? • How do I present the results of my findings?		
Level 1 Understand Numerical Data	**Level 2 Understand Numerical Data**	**Level 3 Understand Numerical Data**
N1.1 The Task will require learners to select relevant numerical data and information from **at least two** different source documents. A range of source materials will be provided to support the Task. The source materials will be of different types and include **at least two** of the following at the appropriate level: • table • chart • graph or diagram	**N2.1** The Task will require learners to collect relevant numerical data and information from **at least three** different source documents. A range of source materials will be provided to support the Task. The source materials will be of different types and include **at least two** of the following at the appropriate level: • table • chart • graph or diagram	**N3.1** The Task will require learners to obtain relevant numerical data and information from **at least three** different source documents. A range of source materials will be provided to support the Task. The source materials will be of different types and include **at least two** of the following at the appropriate level: • table • chart • graph or diagram

The Task will require learners to plan their approach based upon the source material they have selected. The Task will require learners to plan and describe how they are going to tackle the Task.	The Task will require learners to plan their approach based upon the source material they have collected. The Task will require learners to identify, plan and describe how they are going to tackle the Task.	*at least one source will be complex / a large data set will be used.* At least one source must require candidates to collect and record numerical data / information. The Task will require learners to plan their approach based upon the source material they have obtained. The Task will require learners to identify, analyse, effectively describe and plan how they are going to tackle the Task.

Level 1 Carry Out Calculations	Level 2 Carry Out Calculations	Level 3 Carry Out Calculations
N1.2 The Task must be designed to require the learner to carry out calculations from at least two of the following three categories: A) amounts or sizes B) scales or proportion C) handling statistics The Task will require learners to demonstrate the skills that comprise these categories in a way that provides evidence of proficiency at the level. This will include a **minimum of four** of the underpinning skills from **N1.2 b - k**. The Task will require learners to show they have worked to the levels of accuracy required for the purpose and context.	**N2.2** The Task must be designed require the learner to carry out calculations from at least two of the following three categories: A) amounts or sizes B) scales or proportion C) handling statistics The Task will require the use of formulae in **at least one** of the above categories. The Task will require learners to demonstrate the skills that comprise these categories in a way that provides evidence of proficiency at the level. This will include a **minimum of five** of the underpinning skills from **N2.2 b - m.** The Task will require learners to show that they have worked to the levels of accuracy required for the purpose and context.	**N3.2** The Task must be designed require the learner to carry out calculations from at least two of the following three categories: A) amounts or sizes B) scales or proportion C) handling statistics The Task will require the use of formulae in **at least one** of the above categories. The Task will require learners to demonstrate the skills that comprise these categories in a way that provides evidence of proficiency at the level. This will include a **minimum of six** of the underpinning skills from **N3.2 b - d, f - o**. The Task will require learners to show that they have worked to the levels of accuracy required for the purpose and context.

Level 1 Interpret and Present Results and Findings	Level 2 Interpret and Present Results and Findings	Level 3 Interpret and Present Results and Findings
N1.3 The Task will require learners to choose how to present the results of their calculations, using **two** different and appropriate ways from: • tables • charts • graphs or diagrams The Task will require learners to present and describe their findings and explain how their results relate to the purpose of the Task.	**N2.3** The Task will require learners to select how to present the results of their calculations, using **two** different and appropriate ways from: • tables • comparative / component bar charts or pie charts • line graphs or diagrams *and explain why these ways are appropriate to meet the purpose of the Task*. The Task will require learners to present their methods and findings effectively, and explain, emphasising key points, what their results mean and how, and / or if, their methods and results meet their purpose, and are appropriate to the Task.	**N3.3** The Task will require learners to select how to present the results of their calculations, using **two** different and appropriate ways from: • complex tables • comparative / component bar charts or pie charts • multiple line graphs / line graphs or complex diagrams *and justify why these ways are appropriate to meet the purpose of the Task*. The Task will require learners to present their results and explain their findings, emphasising key points and justifying how, and / or if, their methods and results meet their purpose, and are appropriate to the Task.

Confirmatory Test

Essential Application of Number Skills - Level 1

The Essential Application of Number Skills Confirmatory Test at Level 1 will assess aspects of N1.1 and N1.2.

It will consist of 20 items, structured as follows:

	Skills being assessed (**the learner needs to know how to**)	Covered	No of items/ marks	Weighting
N1.1	(a) read, understand and extract information from tables, charts, simple graphs and diagrams	Always	2	7-9 items
	(b) read and understand numbers presented in different ways, including large numbers in figures or words, simple fractions, decimals, percentages, ratios and negative numbers	Always	2	
	(d) read scales on familiar measuring equipment using everyday units	Always	2	
	(e) read, measure and record time in common date and time formats and in context	Sampled	0-1	
	(g) use scales and diagrams to find and interpret information	Sampled	0-1	
	(h) use mathematical properties of 2-D shapes to record measurements	Sampled	0-1	
N1.2	(b) add and subtract with whole numbers and simple decimals without a calculator	Always	2	11-13 items
	(c) multiply and divide a simple decimal by a whole number, without a calculator	Always	2	
	(d) use simple fractions and percentages	Always	2	
	(e) use equivalences between common fractions, percentages and decimals	Always	2	
	(f) add, subtract, multiply, divide and record sums of money	Always	2	
	(g) calculate within a system by:			

	- adding and subtracting common units of measure - converting units of measure in the system	Sampled Sampled	0-1 0-1	
	(h) work out perimeters, areas and volumes	Sampled	0-1	
	(i) use ratios and proportions	Sampled	0-1	
	(k) find the range and average (mean) of up to 10 items	Always	1	
Total			**20**	

Essential Application of Number Skills - Level 2

The Essential Application of Number Skills Confirmatory Test at Level 2 will assess aspects of N2.1 and N2.2.

It will consist of 20 items, structured as follows:

	Skills being assessed (**the learner needs to know how to**)	Covered	No of items/ marks	Weighting
N2.1	a) read, understand and interpret information from tables, diagrams, charts and graphs	Always	2	4-6 items
	b) read and understand numbers presented in different ways	Sampled	0-1	
	d) read scales on a range of equipment to given levels of accuracy	Sampled	0-1	
	e) calculate time in different formats	Sampled	0-1	
	i) understand compound measures	Sampled	0-1	
N2.2	b) carry out calculations involving two or more steps, with numbers of any size, without a calculator	Always	2	14-16 items
	d) work with, and convert between fractions, decimals and percentages	Always	2	
	e) calculate with sums of money and convert between currencies	Always	2	
	f) calculate within a system and between systems using: - conversion tables and scales - approximate conversion factors	 Sampled Sampled	 0-1 0-1	
	h) use proportions and calculate using ratio	Always	2	
	i) identify the range of possible outcomes of combined events through probability and record the information using diagrams or tables	Sampled	0-1	
	j) compare sets of data of a suitable size, selecting and using the mean/ median/ mode as appropriate	Sampled	0-1	

	k) use range to describe the spread within sets of data	Sampled	0-1	
	l) understand and use relevant formulae	Always	2	
	m) calculate efficiently using whole numbers, fractions, decimals and percentages	Always	2	
Total			**20**	

Essential Application of Number Skills - Level 3

The Essential Application of Number Skills Confirmatory Test at Level 3 will assess aspects of N3.1 and N3.2.

Application of statistics will be embedded into the categories below.

It will consist of 30 items, structured as follows:

	Skills being assessed (**the learner needs to know how to**)	Covered	No of items/ marks	Weighting
N3.1	a) read and understand numbers presented in different ways	Always	2-3	7-10 items
	b) read, understand and interpret information from tables, diagrams, charts and graphs	Always	5-7	
N3.2	b) carry out multi-stage calculations efficiently with numbers of any size	Always	3	20-23 items
	c) use powers and roots	Always	3	
	d) use compound measures	Always	3	
	f) calculate missing angles and sides in right-angled triangles from known side and angles	Sampled	1-2	
	h) calculate, measure, record and compare time in different formats	Always	1-2	
	j) calculate within and between systems and make accurate comparisons	Always	3	
	k) solve problems involving irregular 2-D shapes	Always	1-2	
	l) work out actual dimensions from scale drawings and scale quantities up and down	Always	1-2	
	m) work out proportional change	Always	1-2	
	n) compare distributions, using measures of average and interquartile range, and estimate mean, median and range of grouped data	Sampled	1-2	
	o) rearrange and use formulae, equations and expressions	Always	3	
	Total		**30**	

Essential Application of Number Skills

Practitioner/Assessor Guidance

Essential Application of Number Skills - Level 1

The table below shows the skills learners will need to have in order to achieve the Essential Application of Number Skills qualification. These skills should be taught before learners complete the *Controlled Task* and *Confirmatory Test*. The 'guidance' in the third column supports the requirements of the first two columns.

N1.1 Understand Numerical Data

Learning outcome *(EAoNS Specification)*	**The learner needs to know how to:** *(skills to be taught in preparation for Task and Test assessments)*	**Practitioner / Assessor guidance** *(guidance on skills development)*
N1.1.1 understand, plan and describe how to tackle a given practical problem or task that involves numerical data and information	a) plan and describe how to tackle a problem or task	**understand a problem or task** A practical problem or task provided by the practitioner / assessor. **plan and describe** Supporting the development of EAoNS at L1 - *using numerical data and information to make accurate observations / identifying suitable calculations to achieve an appropriate outcome.*
N1.1.2 select relevant numerical data and information from at least two different sources relevant to meeting the purpose of a task	a) read, understand and extract information from tables, charts, simple graphs and diagrams b) read and understand numbers presented in different ways, including large numbers in figures or words, simple fractions, decimals, percentages, ratios and negative numbers c) collect and record data from	**read, understand and extract** Independently selecting relevant numerical data and information from given graphical, numerical and written sources - *where learners decide to use their own sources, the practitioner / assessor should check for suitability.* Straightforward everyday material / used for different purposes. *Interpreting everyday data e.g. in charts, graphs:* *-understanding that these are not used just to inform - can*

	accurate observations d) read scales on familiar measuring equipment using everyday units e) read, measure and record time in common date and time formats and in context f) use appropriate units and instruments to estimate, read, measure and compare length, weight, capacity, time and temperature g) use scales on diagrams to find and interpret information h) use mathematical properties of 2-D shapes to record measurements	*also be used to persuade, mislead* *-developing skills in critical questioning.* *Considering more than one way to present the same data e.g. different scales for the same format.* **read and understand numbers presented in different ways** *Reading numbers in words and digits in everyday material, including negative numbers, simple fractions, decimals and percentages; discussing place value up to 7 digits / decimals up to three places; using zero as a place holder; using symbols for 'greater than' / 'less than'.* **read numbers and record accurate observations** *Using units and instruments for different measuring tasks e.g. for discrete data collection.*

N1.2 Carry out Calculations

Learning outcome *(EAoNS Specification)*	**The learner needs to know how to:** *(skills to be taught in preparation for Task and Test assessments)*	**Practitioner / Assessor guidance** *(guidance on skills development)*
N1.2 use the data and information identified in N1.1 to carry out calculations appropriate to a task to do with: A) amounts or sizes B) scales or proportion C) handling statistics	a) work to given levels of accuracy b) add and subtract with whole numbers and simple decimals, with and without a calculator c) multiply and divide a simple decimal by a whole number, with and without a calculator d) use simple fractions and percentages e) use equivalencies between common fractions, percentages and decimals f) add, subtract, multiply, divide and record sums of money g) calculate within a system by: - adding and subtracting common units of measure - converting units of measure in the system h) work out perimeters, areas and volumes i) use ratios and proportions j) use probability to show (using fractions, decimals and percentages) that some events	**carry out calculations** Levels of accuracy for calculations should be provided for learners / learner calculations should show that given levels of accuracy have been considered **(a)**. **(b)**, **(c)**, **(f)** *e.g. using addition, subtraction, multiplication and division efficiently when solving problems with whole numbers / decimals up to two places, including money calculations, with and without a calculator; multiplying and dividing whole numbers and decimals by 10 and 100.* **(d)**, **(e)** *e.g. using common equivalent fractions e.g. 3/6 = 1/2; finding fractional and percentage parts e.g. 3/4, 20% of an amount; finding percentage increase and decrease e.g.10% reduction in cost / 1% pay rise; using a calculator to investigate fractions as decimals and percentages; recognising equivalencies e.g. 50% = 1/2, 0.25 = 1/4.* **(g)** *e.g. knowing the relationship between metric units e.g. calculating a weight gain over a period of time; converting measurements to the same units when working out an area; comparing the dimensions of office furniture items given in mm / cm.* **(h)** *e.g. discussing the meaning of perimeters, areas and volumes, how they are measured and their use in practical contexts; investigating simple shapes with the same perimeter; knowing that measurements must be in the same units before calculating.*

	are more likely to occur than others k) find the range and average (mean) of up to 10 items l) use different ways of checking methods and calculations m) identify and correct errors n) check that results make sense	**(i)** *e.g. using ratio in everyday situations; direct proportion - scaling quantities up or down e.g. in recipes, cement mixes; calculating actual measurements from a scale drawing.* **(j)** *e.g. knowing that probability is an expression of likelihood - what is certain to happen / cannot happen / might happen e.g. a fifty-fifty chance, 50%, 1/2 or .5 when tossing a coin.* **(k)** *e.g. understanding that range measures the spread of a set of data; knowing that mean is one type of average and can give a 'distorted average'.* **(l)**, **(m)**, **(n)** *e.g. estimating answers; approximating by rounding; using checking methods e.g. using a calculator, inverse operations; judging when answers are sensible.*

N1.3 Interpret and Present Results and Findings

Learning outcome *(EAoNS Specification)*	**The learner needs to know how to:** *(skills to be taught in preparation for Task and Test assessments)*	**Practitioner / Assessor guidance** *(guidance on skills development)*
N1.3.1 choose how to present the results of calculations using tables, charts, graphs or diagrams	a) identify more than one appropriate way to present findings to a given audience, including using tables, charts, graphs or diagrams b) use appropriate ways to present findings, including a table, chart, graph or diagram, using the correct units	**choose ways to present** Using more than one suitable way to present findings to a given audience - *using labelling e.g. suitable headings, correctly labelled axes, sensible scales*.

	c) label work correctly	
N1.3.2 present and describe the meaning of results and explain how they meet the purpose of a task	a) interpret results of calculations b) show how results relate to a problem or task c) describe meaning of results and explain how they meet the purpose of a task	**present, describe and explain** Understanding the meaning of results within the context of a problem or task: ▪ *presenting and describing the results of calculations* ▪ *explaining how they meet their purpose* *(e.g. explaining why the results of calculations suggest that a proposed solution will / will not work.)*

Essential Application of Number Skills - Level 2

The table below shows the skills learners will need to have in order to achieve the Essential Application of Number Skills qualification. These skills should be taught before learners complete the *Controlled Task* and *Confirmatory Test*. The 'guidance' in the third column supports the requirements of the first two columns.

N2.1 Understand Numerical Data

Learning outcome *(EAoNS Specification)*	**The learner needs to know how to:** *(skills to be taught in preparation for Task and Test assessments)*	**Practitioner / Assessor guidance** *(guidance on skills development)*
N2.1.1 identify and then plan and describe how to tackle a practical problem or task that involves numerical data and information	a) plan and describe how to tackle a problem or task b) select and compare relevant information c) explain choice of methods when relevant	**identify a problem or task** An outline problem or task provided by the practitioner or assessor or a problem or task identified by the learner - *where learners decide to use their own problem or task, the practitioner / assessor should check for suitability.* **plan and describe** Supporting the development of EAoNS at L2 - *using mathematical language and information to increase understanding / selecting appropriate methods for carrying through a substantial activity.*
N2.1.2 collect relevant numerical data and information from a range of sources to meet the purpose of a task	a) read, understand and interpret information from tables, charts, graphs and diagrams b) read and understand numbers presented in different ways c) collect and record data from accurate observations d) read scales on a range of	**collect, record and interpret** Learners should independently select relevant numerical data and information from a range of graphical, numerical and written sources. *Interpreting data e.g. line graphs with more than one line; understanding the difference between discrete data and continuous data; knowing continuous data is collected through measurement /*

	equipment to appropriate levels of accuracy e) calculate time in different formats f) estimate, measure and compare length, weight, capacity, temperature, using metric and, where appropriate, imperial units g) recognise and use common 2-D representations of 3-D objects h) estimate amounts and proportions i) understand compound measures	*can only be collected to a certain degree of accuracy.* **read and understand numbers presented in different ways** *Using practical contexts for reading, writing, ordering and comparing positive and negative numbers e.g. using large numbers to discuss population figures / national debt.* **read numbers and record accurate observations** *Using units and instruments for different measuring tasks e.g. data collection to appropriate levels of accuracy.*

N2.2 Carry out Calculations

Learning outcome *(EAoNS Specification)*	**The learner needs to know how to:** *(skills to be taught in preparation for Task and Test assessments)*	**Practitioner / Assessor guidance** *(guidance on skills development)*
N2.2 use data and information collected in N2.1 to carry out calculations appropriate to a task to	a) show clearly methods of carrying out calculations including working to appropriate levels of accuracy b) carry out calculations involving two or more steps, with numbers of any size, with and	**carry out calculations** Levels of accuracy for calculations should be decided on / worked to by learners **(a)**. **(b)**, **(c)**, **(d)**, **(e)**, **(m)** *e.g. carrying out a range of different calculations (involving two steps or more) with numbers of any size, in practical*

do with: A) amounts or sizes B) scales or proportion C) handling statistics D) using formulae	without a calculator c) use mental arithmetic involving whole numbers and simple fractions d) work with, and convert between fractions, decimals and percentages e) calculate with sums of money and convert between currencies f) calculate within a system and between systems using: - conversion tables and scales - approximate conversion factors g) solve problems involving 2-D shapes and parallel lines h) use proportions and calculate using ratios i) identify the range of possible outcomes of combined events through probability and record the information using diagrams or tables j) compare sets of data of a suitable size, selecting and using the mean / median / mode as appropriate k) use range to describe the spread within sets of data l) understand and use relevant	*contexts, using efficient methods - written and mental / with and without a calculator.* **(d)** *e.g. using fractions, decimals to order and compare quantities / amounts; changing fractions to equivalent fractions for adding and subtracting purposes; calculating with decimals up to three places; evaluating one number as a fraction, decimal, percentage of another e.g. 1/4 hour = 0.25 hour / 750g as a fraction of a kilogram; understanding percentage increase and decrease e.g. for VAT, APR.* **(f)** *e.g. recognising equivalences between imperial and metric measures e.g. a gallon is approx. 4.5 litres; knowing the relationship between metric units / between common imperial units; reading conversion tables and scales and using approximate conversions.* **(g)**, **(l)** *e.g. identifying relevant formulae and carrying out calculations e.g. perimeters / areas / volumes - regular and composite shapes; using parallel lines in practical examples e.g. laying floor tiles; evaluating simple formulae using brackets e.g. perimeter = 2(l + w); using simple formulae in spreadsheets.* **(h)**, **(i)** *e.g. understanding how to calculate the value of one part in a given ratio; using direct proportion in everyday contexts e.g. scaling recipes; calculating actual measurements from a scale drawing; discussing possible outcomes of an event e.g. throwing a die, tossing a coin; recording findings in tables / tree diagrams.* **(j)**, **(k)** *e.g. comparing discrete / continuous data - finding the mean / median / mode to compare two sets of data / the range to describe the spread; considering the 'best' average and 'distorted' average; exploring the 'average', 'median', 'mode' functions in a spreadsheet.* **(n), (o)**, **(p)** *e.g. using different methods to check answers - estimation, approximation by rounding; identifying and correcting*

	formulae m) calculate efficiently using whole numbers, fractions, decimals and percentages n) use different ways of checking methods and calculations o) identify and correct errors p) check that results make sense	*errors; judging when answers are sensible.*

N2.3 Interpret and Present Results and Findings

Learning outcome *(EAoNS Specification)*	**The learner needs to know how to:** *(skills to be taught in preparation for Task and Test assessments)*	**Practitioner / Assessor guidance** *(guidance on skills development)*
N2.3.1 select two different ways to present results using tables, charts, graphs or diagrams, as appropriate to meet the purpose of a task	a) understand what the results of calculations mean in the context of a problem or task b) identify and describe appropriate ways to present findings to different audiences, including numerical, graphical and written formats c) present findings effectively	**select ways to present** Using more than one way to present results - clear and accurate, appropriate to purpose, findings and identified audience - *using labelling e.g. suitable headings, correctly labelled axes, sensible scales,* describing chosen approach.
N2.3.2 present and explain methods and results, and how they meet the purpose and are	a) construct complex tables, charts, graphs and diagrams and label with titles, scales, axes and keys appropriate to purpose and audience b) use more than one way to	**present, describe and explain** Understanding the meaning of results within the context of a problem or task: ▪ *presenting and describing the results of calculations* ▪ *explaining the methods used and how they meet their*

appropriate for a task	present findings including numerical, graphical and written formats c) explain methods used, highlighting main points of findings and explain how /or if they meet purpose	*purpose* *(e.g. explaining why the results of calculations suggest that a proposed solution will / will not work.)*

Essential Application of Number Skills - Level 3

The table below shows the skills learners will need to have in order to achieve the Essential Application of Number Skills qualification. These skills should be taught before learners complete the *Controlled Task* and *Confirmatory Test*. The 'guidance' in the third column supports the requirements of the first two columns.

N3.1 Understand Numerical Data

Learning outcome *(EAoNS Specification)*	**The learner needs to know how to:** *(skills to be taught in preparation for Task and Test assessments)*	**Practitioner / Assessor guidance** *(guidance on skills development)*
N3.1.1 identify, analyse, effectively describe and plan how to tackle a practical problem or task that involves a range of numerical data and information	a) identify, analyse and describe a problem or task and its sub problems b) plan how to tackle a problem by breaking it down into a series of tasks c) plan how to obtain required data and information d) select and critically compare relevant information e) consider range of possible methods to be used, including grouping data f) choose relevant methods g) adapt methods as appropriate h) justify why methods are appropriate for a task	**problem** Independently identify, analyse and describe in detail a practical problem or task - *practitioners / assessors can provide a brief for learners; where learners decide on their own problem or task, the practitioner / assessor should check that it is sufficiently demanding; where two sets of data are being compared, one set of data can be provided by the practitioner / assessor.* **plan** The problem or task should support the development of EAoNS at L3 - *independently selecting and critically comparing relevant information from a range of graphical, numerical and written sources / choosing appropriate methods for carrying through a substantial activity.* The problem or task should include sub-problems; techniques should be relatively sophisticated *e.g. interrelated multi-stage calculations rather than those that require two or more separate*

		steps; problems should offer different possible approaches. At this level, learners should be moving from straightforward problems or tasks to the demands of more complex activities and techniques *e.g. demonstrating more explicit reasoning ability e.g. devising a business plan taking into account costs, market potential, size of premises*. Learners should consider the nature and sequence of tasks in their planning / clearly justify their approaches and methods in relation to suitability for purpose and circumstances. Learners should be encouraged to extend their knowledge of methods *e.g. looking up formulae or information relating to similar problems or tasks.*
N3.1.2 collect relevant numerical data and information from a range of sources to meet the purpose of a task	a) read and understand numbers presented in different ways b) read, understand and interpret information from tables, charts, graphs and diagrams c) collect and record data from accurate observations d) collect, obtain, select and record relevant data and information from different sources e) use at least one large data set of a size appropriate to a planned activity, and use this to meet the purpose of the activity f) make accurate and reliable	**collect, record and interpret** Learners should independently select relevant numerical data and information from a range of graphical, numerical and written sources - *to enable handling data from a large data set (usually over 50) / enable realistic grouping of data*. *Interpreting data - e.g. scales such as 1: 1250 on maps; graphs with several graph lines on the same axes e.g. weights against heights for a range of body mass indexes / forecasting trends / estimating values within a graph.* **read and understand numbers presented in different ways** *Reading, writing, ordering and comparing positive and negative numbers of any size e.g. £1.5 billion, 3.2 x 10^{-3}.* **read numbers and record accurate observations**

	observations over time and use suitable equipment to measure in a variety of appropriate units g) group data into classes of width appropriate to the data h) use estimation to help planning i) read and understand ways of writing very large and very small numbers j) understand compound measures	*Using units and instruments for different measuring tasks.*

N3.2 Carry out Calculations

Learning outcome *(EAoNS Specification)*	**The learner needs to know how to:** *(skills to be taught in preparation for Task and Test assessments)*	**Practitioner / Assessor guidance** *(guidance on skills development)*
N3.2 use the data and information obtained in N3.1 to carry out calculations relevant to a task to do with: A) amounts or sizes B) scales or	a) show clearly methods of carrying out calculations, justifying levels of accuracy of results b) carry out multi-stage calculations efficiently with numbers of any size c) use powers and roots d) use compound measures e) use mental arithmetic involving numbers, simple fractions and	**carry out multi-stage calculations** 'Multi-stage' - *calculations where the results from one stage are used to provide information for the next stage.* Learners should record methods and approaches used and work to suitable levels of accuracy, giving justification for choice. **(a)** Carrying out multi-stage calculations with numbers of any size using efficient methods - written and mental / with and without a calculator; using calculators effectively and efficiently; using different strategies to check answers *e.g. inverse operations*; identifying and correcting

proportion C) handling statistics D) using formulae	percentages f) calculate missing angles and sides in right-angled triangles from known sides and angles g) calculate with sums of money in different currencies h) calculate, measure, record and compare time in different formats i) estimate, measure and compare dimensions and quantities using metric and, where appropriate, imperial units, and check accuracy of estimates j) calculate within and between systems and make accurate comparisons k) solve problems involving irregular 2-D shapes l) work out actual dimensions from scale drawings and scale quantities up and down m) work out proportional change n) compare distributions, using measures of average and interquartile range, and estimate mean, median and range of grouped data o) rearrange and use formulae, equations and expressions p) use estimation and other	errors; judging when answers are sensible. **(a)**, **(b)**, **(d)**, **(e), (g)**, **(h)**, **(i)**, **(j)**, **(l)**, **(m)**, **(o)**, **(p)**, **(q)**. *Solving life numerical problems e.g. compound interest, hire purchase, taxation, profit and loss, appreciation and depreciation e.g.* **(c), (f)** *e.g. using powers and roots e.g. 'square', 'cube', 'square root', 10^6, 10^{-3}; finding missing angles and sides e.g. when working out the space implications for ramps at different slopes, when it is quicker to use calculations rather than scale drawings.* **(n)** *e.g. comparing distributions of grouped data - visual e.g. frequency charts, histograms, cumulative frequency graphs / numerical e.g. calculations of mean, median and interquartile range.* **(k)** *using formulae with letters and rearranging them so as to change the subject (output) of a formula, such as making W or h the subject rather than b in b = hW2 as well as finding the value of W given the values of h and b.*

	checking procedures to identify and correct errors in methods, calculations and results q) check that results make sense	

N3.3 Interpret and Present Results and Findings

Learning outcome *(EAoNS Specification)*	**The learner needs to know how to:** *(skills to be taught in preparation for Task and Test assessments)*	**Practitioner / Assessor guidance** *(guidance on skills development)*
N3.3.1 select two different ways to present results using tables, charts, graphs or diagrams, as appropriate to meet the purpose of a task, and justify choice	a) understand what the results of calculations mean in the context of a problem or task b) select and use appropriate methods to effectively present and illustrate findings, showing trends and making comparisons, including numerical, graphical and written formats c) justify choice of methods of presentation	**select ways to present** Using more than one way to present results - clear and accurate, appropriate to purpose, findings and audience - *using labelling e.g. suitable headings, correctly labelled axes, sensible scales.* Learners should consider critically the strengths and weaknesses of alternative methods of presenting *e.g. a different type of graph or chart,* and give reasons to support their choice/s. *e.g. a graph with several graph lines on the same axis, histogram, frequency polygon, scatter diagram, scale drawing.*
N3.3.2 present results and findings and justify how they meet the purpose, and are appropriate to	a) construct complex tables, charts, graphs and diagrams, and label with titles, scales, axes and keys appropriate to purpose and audience b) use more than one way to	**present, explain and justify** Understanding the meaning of results within the context of a problem or task: ▪ *clearly and accurately presenting and explaining the results of*

a task	present results including numerical, graphical and written formats c) justify methods used highlighting main points of findings and explain how far results meet purpose d) draw appropriate conclusions based on findings, including how possible sources of error might have affected results	*calculations / justifying the approaches and methods used and how they meet their purpose.* Conclusions should not only be supported by evidence but also include an assessment of the likely dependability or accuracy of the results *e.g. considering possible inaccuracies in the original information / approximations in calculations.*

Essential Application of Number Skills

Learner Guidance

Essential Application of Number Skills - Level 1

The table below shows the skills you will need to have in order to achieve the Essential Application of Number Skills qualification. You and your tutor / assessor should be confident that you can do all of these things before you complete the *Controlled Task* and *Confirmatory Test*.

N1.1 Understand Numerical Data

Learning outcome *(EAoNS Specification)*	**You need to know how to:** *(skills needed)*	**Learner guidance** *(guidance on the skills you need)*
N1.1.1 understand, plan and describe how to tackle a given practical problem or task that involves numerical data and information	a) plan and describe how to tackle a problem or task	**understand a problem or task** A problem or task provided by your tutor or assessor - *e.g. by talking about it with your tutor or assessor - repeating it in your own words and/ or asking for more detail.* **plan and describe** Your plan needs to show the order in which you will do your task and the methods you will use - *e.g. producing a flow chart, a simple written plan, a bulleted list / describing the calculations you will be using - 'I will calculate the area of the workshop ', 'I will calculate the mean of 10 rental prices.*
N1.1.2 select relevant numerical data and information from at	a) read, understand and extract information from tables, charts, simple graphs and diagrams b) read and understand numbers	**read, understand and extract** Numerical data and information from a range of sources - those provided for you or those you have found yourself* *(*check with your tutor or assessor that your sources are suitable)*.

least two different sources relevant to meeting the purpose of a task	presented in different ways, including large numbers in figures or words, simple fractions, decimals, percentages, ratios and negative numbers c) collect and record data from accurate observations d) read scales on familiar measuring equipment using everyday units e) read, measure and record time in common date and time formats and in context f) use appropriate units and instruments to estimate, read, measure and compare length, weight, capacity, time and temperature g) use scales on diagrams to find and interpret information h) use mathematical properties of 2-D shapes to record measurements	You need to show that you can get information from: ▪ tables *(e.g. timetable, price list)* ▪ charts *(e.g. pictogram, pie chart, bar chart - to identify the number of items sold on a given day / the sales for a week)* ▪ single line graphs *(e.g. to identify the temperature at given times of the day)* ▪ diagrams *(e.g. simple map, scale plan).* **read and understand numbers presented in different ways** *e.g. writing down spoken numbers - 'one thousand and fifty', 'two-thirds'; recognising decimal fractions, knowing that one-third is a bit more than 30% or 0.3; reading negative numbers, simple fractions, decimals and ratios in everyday situations e.g. -5˚, 1/2 a cup, 1.5% of the population, 1:2 - sugar to flour ratio.* **read numbers and record accurate observations** Those that meet the purpose of the problem or task - *e.g.* ▪ *from a thermometer, tape measure, measuring jug* ▪ *using everyday units e.g. minutes, millimetres, litres, grams, degrees; recording results to the nearest whole number / centimetre* ▪ *interpreting diagrams or drawings e.g. floor plans / assembly instructions.*

N1.2 Carry Out Calculations

Learning outcome *(EAoNS Specification)*	**You need to know how to:** *(skills needed)*	**Learner guidance** *(guidance on the skills you need)*
N1.2 use the data and information identified in N1.1 to carry out calculations appropriate to a task to do with: (A) amounts or sizes (B) scales or proportion (C) handling statistics	a) work to given levels of accuracy b) add and subtract with whole numbers and simple decimals, with and without a calculator c) multiply and divide a simple decimal by a whole number, with and without a calculator d) use simple fractions and percentages e) use equivalencies between common fractions, percentages and decimals f) add, subtract, multiply, divide and record sums of money g) calculate within a system by: - adding and subtracting common units of measure - converting units of measure in the system h) work out perimeters, areas and volumes i) use ratios and proportions j) use probability to show (using fractions, decimals and percentages) that some events	**carry out calculations** Different types of calculations that are needed for the problem or task. You need to show that you: ▪ are clear about why you are using certain calculations ▪ can work to the levels of accuracy you have been given *e.g. to the nearest 10p, tenth / rounding results - £10.99 is approximately £11* ▪ can carry out calculations with and without a calculator ▪ understand why it is important to check your results ▪ are able to check your methods and calculations in different ways *e.g. by estimating; using a calculator or spreadsheet software* ▪ have checked your calculations make sense. You also need to show skills in the following categories of calculations: *A)* **amounts or sizes** *e.g.* ▪ working with simple decimals *e.g. to calculate the cost of a trip* ▪ using simple fractions to find parts of whole numbers *e.g. to find 2/3 of £18* ▪ finding simple percentages *e.g. to work out a discount of 20%* ▪ finding the perimeter / area of simple shapes *e.g. to find the*

	are more likely to occur than others k) find the range and average (mean) of up to 10 items l) use different ways of checking methods and calculations m) identify and correct errors n) check that results make sense	*amount of skirting board needed / the amount of flooring required* ▪ using simple volumes *e.g. cubes and cuboids - to find the volumes of storage boxes* ▪ converting within a system *e.g. converting 70 minutes to 1 hour 10 minutes when planning a trip; 0.56 metres to 560 millimetres.* *B)* **scales or proportion** *e.g.* ▪ using simple scales on diagrams to work out actual measurements *e.g. using a scale of 1:100 to find a distance* ▪ increasing and reducing whole number amounts using ratio and direct proportion *e.g. changing quantities in a recipe to make twice or three times as much.* *C)* **handling statistics** *e.g.* ▪ working out the range and mean of a group of up to 10 numbers *e.g. range of a patient's temperature in a 24-hour period; mean average salary / daily attendance.*

N1.3 Interpret and Present Results and Findings

Learning outcome *(EAoNS Specification)*	**You need to know how to:** *(skills needed*)	**Learner guidance** *(guidance on the skills you need)*
N1.3.1 choose how to present the results of calculations using tables, charts, graphs or diagrams	a) identify more than one appropriate way to present findings to a given audience, including using tables, charts, graphs or diagrams b) use appropriate ways to present findings, including a table, chart, graph or diagram, using the correct units c) label work correctly	**choose ways to present** Use more than one way to present your findings - *e.g. in a task relating to average house prices in an area - a bar chart showing the different house types / a diagram showing how far some of the houses are from local amenities.* Show labelling *e.g. suitable headings, correctly labelled axes, sensible scales.*
N1.3.2 present and describe the meaning of results and explain how they meet the purpose of a task	a) interpret results of calculations b) show how results relate to a problem or task c) describe meaning of results and explain how they meet the purpose of a task	**present, describe and explain** The meaning of your results should make sense and be fit for purpose when presented to others. The results of your calculations need to be connected to the problem or task and clearly described and explained, showing checking for accuracy - *it is not enough just to show a correct calculation, you need to show an understanding of your results* - *e.g. average house price task - ' I have found the mean house price in the area is £145,000…the range of house prices is £230,000 which shows there is a big difference between house prices in the area…'*

Essential Application of Number Skills - Level 2

The table below shows the skills you will need to have in order to achieve the Essential Application of Number Skills qualification. You and your tutor / assessor should be confident that you can do all of these things before you complete the *Controlled Task* and *Confirmatory Test*.

N2.1 Understand Numerical Data

Learning outcome *(EAoNS Specification)*	**You need to know how to:** *(skills needed)*	**Learner guidance** *(guidance on the skills you need)*
N2.1.1 identify and then plan and describe how to tackle a practical problem or task that involves numerical data and information	a) plan and describe how to tackle a problem or task b) select and compare relevant information c) explain choice of methods when relevant	**identify a problem or task** Either an outline problem or task provided by your tutor or assessor or a problem or task identified by you* *(*check with your tutor or assessor that your problem or task is suitable).* **plan and describe** Your plan needs to show clear sequencing of tasks and how you intend to obtain and use data and information; provide a description of your methods and reasons for your choice - *e.g. producing a flow chart, a written plan, a bulleted list / comments such as - 'I will use the median average as it is most appropriate for this task…' 'I will use the mode for restocking because I need to find the most popular items sold'.*
N2.1.2 collect relevant numerical data and	a) read, understand and interpret information from tables, charts, graphs and diagrams b) read and understand numbers	**collect, record and interpret** Independently collect from a range of sources provided by your tutor

information from a range of sources to meet the purpose of a task	presented in different ways c) collect and record data from accurate observations d) read scales on a range of equipment to appropriate levels of accuracy e) calculate time in different formats f) estimate, measure and compare length, weight, capacity, temperature, using metric and, where appropriate, imperial units g) recognise and use common 2-D representations of 3-D objects h) estimate amounts and proportions i) understand compound measures	or assessor, or identify sources for yourself. You need to show that you are clear about how the data and information you have collected meet your purpose - *this could include primary data.* Collect, interpret and record data and information from: ▪ tables *(e.g. detailed timetable or price list)* ▪ charts *(e.g. comparative bar chart and pie chart e.g. measuring rainfall in two countries over the same period)* ▪ line graphs *(e.g. temperature readings over a period of time)* ▪ diagrams *(e.g. map, scale plan).* Sources can include: graphical and/ or written material e.g. ▪ reference books / journals / newspapers ▪ statistical information *e.g. on health, employment, education* ▪ direct measurements or observations ▪ primary data *e.g. surveys of opinions.* **read and understand numbers presented in different ways** Large numbers in everyday material *e.g. population figures, cost of major construction projects, government initiatives, football transfer fees* *e.g. negative numbers - temperature below zero / loss in trading* *e.g. numbers in words and digits; outcome of an observation = 1/8, 0.125, 12.5%.*

		read numbers and record accurate observations Those that meet the purpose of the problem or task *e.g.* ▪ *read scales e.g. 1:2500 on a map* ▪ *calculate journey times from timetables* ▪ *estimate and check distances between cities in the UK* ▪ *interpret diagrams or drawings e.g. floor plans / assembly instructions* ▪ *use compound measures e.g. - 'something per something' - milligrams per 100 millilitres / miles per hour.*

N2.2 Carry Out Calculations

Learning outcome *(EAoNS Specification)*	**You need to know how to:** *(skills needed)*	**Learner guidance** *(guidance on the skills you need)*
N2.2 use data and information collected in N2.1 to carry out calculations appropriate to a task to do with: A) amounts or sizes	a) show clearly methods of carrying out calculations including working to appropriate levels of accuracy b) carry out calculations involving two or more steps, with numbers of any size, with and without a calculator c) use mental arithmetic involving whole numbers and simple fractions	**carry out calculations** Different types that are appropriate for the problem or task. You need to show that you: ▪ are clear about the purpose and relevance of your calculations ▪ can work to suitable levels of accuracy *e.g. two decimal places, nearest ten thousand - you need to give reasons for your choice*

B) scales or proportion C) handling statistics D) using formulae	d) work with, and convert between fractions, decimals and percentages e) calculate with sums of money and convert between currencies f) calculate within a system and between systems using: - conversion tables and scales - approximate conversion factors g) solve problems involving 2-D shapes and parallel lines h) use proportions and calculate using ratios i) identify the range of possible outcomes of combined events through probability and record the information using diagrams or tables j) compare sets of data of a suitable size, selecting and using the mean / median / mode as appropriate k) use range to describe the spread within sets of data l) understand and use relevant formulae m) calculate efficiently using whole numbers, fractions, decimals and percentages	▪ can carry out calculations with and without a calculator - *including using mental methods* ▪ understand why it is important to check your results ▪ are able to check your methods and calculations in different ways *e.g. by estimating; using a calculator or spreadsheet software* ▪ have checked your calculations make sense. You also need to show that you can carry out calculations using two or more steps when working with: A) **amounts or sizes** *e.g.* ▪ *converting between fractions, decimals and percentages* ▪ *calculating the amount in sterling of an item quoted in euros* ▪ *using rough equivalencies e.g.1lb is about 450 grams / a kilogram is a bit more than 2lb* ▪ *using conversion tables to convert weights, lengths and capacities e.g. food items, timber dimensions* ▪ *calculating amount of carpet required for an L shaped room* ▪ *calculating the volume of a room to find out how many people it can accommodate for health and safety purposes.* **B) scales or proportion** *e.g.* ▪ *deciding on the best buy in a supermarket* ▪ *using scales on maps e.g. 5cm to 2km* ▪ *sharing £60 in the ratio 3:5.* **C) handling statistics** You need to show that you can work with data sets that are of an appropriate size for the purpose of your task; they must be large enough to enable you to make meaningful calculations of mean and/

	n) use different ways of checking methods and calculations o) identify and correct errors p) check that results make sense	or median and/ or mode, and make meaningful comparisons *e.g.* ▪ *compare the performance of sales results in two different countries* ▪ *use the mean to compare salaries within a company.* **D) using formulae** You need to show that you can use the formulae you have been given *e.g.* ▪ *using formulae expressed in words and symbols - 'length in cm ÷ 2.54 = length in inches' / 'cm ÷ 2.54 = l'.* Using formulae should be an integral part of your task *e.g. calculate:* ▪ area of a wall area for painting excluding doors and windows ▪ cooking times using given formulae ▪ amount of fencing needed for a circular pond ▪ average speed for a journey. (You do not have to show that you can create or rearrange formulae.)

N2.3 Interpret and Present Results and Findings

Learning outcome *(EAoNS Specification)*	**You need to know how to:** *(skills needed)*	**Learner guidance** *(guidance on the skills you need)*
N2.3.1 select two different ways to present results using tables, charts, graphs or diagrams, as appropriate to meet the purpose of a task	a) understand what the results of calculations mean in the context of a problem or task b) identify and describe appropriate ways to present findings to different audiences, including numerical, graphical and written formats c) present findings effectively	**select ways to present** Use more than one appropriate way to present your findings to your audience - *show that you can identify and describe different ways.* You need to show that you have checked for accuracy. All presentations should be labelled *e.g. suitable headings, correctly labelled axes, sensible scales* e.g. ▪ table ▪ comparative / component bar chart or pie chart *e.g. comparing boys' growth to girls'; showing the proportion of a population within each Body Mass Index (BMI) category* ▪ line graph *e.g. comparing temperatures in two countries over a year* ▪ diagram *e.g. tree diagram showing the outcome of two football matches.*
N2.3.2 present and explain methods and results, and how they meet the purpose and are appropriate for a task	a) construct complex tables, charts, graphs and diagrams and label with titles, scales, axes and keys appropriate to purpose and audience b) use more than one way to present findings including numerical, graphical and	**present, describe and explain** You need to show that you are able to present and describe your methods and findings and explain how they meet your purpose, showing checking for accuracy - *it is not enough just to show a correct calculation, you need to show an understanding of your results e.g.*

	written formats c) explain methods used, highlighting main points of findings and explain how /or if they meet purpose	*-comparing modal use of a leisure centre to decide on staff rotas - 'I considered weekend activity at the leisure centre and found that on a Sunday, twice as many people use the leisure centre; this has implications for staff rotas…'.* Your findings need to be presented in a way that makes it easy for your audience to identify the key points.

Essential Application of Number Skills - Level 3

The table below shows the skills you will need to have in order to achieve the Essential Application of Number Skills qualification. You and your tutor / assessor should be confident that you can do all of these things before you complete the *Controlled Task* and *Confirmatory Test*.

N3.1 Understand Numerical Data

Learning outcome *(EAoNS Specification)*	**You need to know how to:** *(skills needed)*	**Learner guidance** *(guidance on the skills you need)*
N3.1.1 identify, analyse, effectively describe and plan how to tackle a practical problem or task that involves a range of numerical data and information	a) identify, analyse and describe a problem or task and its sub problems b) plan how to tackle a problem by breaking it down into a series of tasks c) plan how to obtain required data and information d) select and critically compare relevant information e) consider range of possible methods to be used, including grouping data f) choose relevant methods g) adapt methods as appropriate h) justify why methods are appropriate for a task	**problem** Independently identify, analyse and describe in detail a problem or task - *about which you have been briefed or you have chosen* (*check with your tutor or assessor that what you have chosen is appropriate - it needs to have clear purpose / allow you to meet all learning outcomes).* Problems need to include sub-problems - *requiring you to consider carefully the nature and sequence of tasks when you are planning how to obtain and use information to meet your purpose.* Techniques should be relatively sophisticated *e.g. interrelated multi-stage calculations rather than those that require two or more separate* steps. Problems should offer different possible approaches which you need to evaluate in order to decide how best to tackle the problem. **plan**

		You need to include: ▪ details of how you intend to obtain relevant data and information ▪ a clear sequence of tasks showing how you intend to use the information ▪ an identification of the methods you will use *e.g. looking up formulae or information relating to similar problems* ▪ a justification of your chosen methods. You need to show that you can: ▪ specify the problem ▪ formulate questions in terms of the data you need ▪ plan how you will obtain this information and what you are going to do *e.g. methods you will use for organising data e.g. tabulating and grouping; types of calculations; how you will take account of variability or bias.* You need to say why you are approaching the task in the way you are.
N3.1.2 collect relevant numerical data and information from a range of sources to meet the purpose of a task	a) read and understand numbers presented in different ways b) read, understand and interpret information from tables, charts, graphs and diagrams c) collect and record data from accurate observations d) collect, obtain, select and record relevant data and information from different sources	**collect, record and interpret** Independently collect data and information from a range of sources - *sources provided by your tutor or assessor and/ or sources provided by you.* Sources can include: ▪ graphical and/ or written material *e.g. reference books / journals / newspapers / internet* ▪ statistical information *e.g. on health, employment, education* ▪ direct measurements or observations

	e) use at least one large data set of a size appropriate to a planned activity, and use this to meet the purpose of the activity f) make accurate and reliable observations over time and use suitable equipment to measure in a variety of appropriate units g) group data into classes of width appropriate to the data h) use estimation to help planning i) read and understand ways of writing very large and very small numbers j) understand compound measures	▪ primary data *e.g. surveys of opinions.* Sources need to include: ▪ table ▪ chart ▪ graph or diagram. *(Some sources need to be complex / require you to work with large data sets / require you to collect and record data and information.)* **complex sources** *e.g.* *-a table of 100 countries, of which you need to choose 50 and select 4 from 12 relevant development indicators.* **large data set** (set of at least 50 items) Your data set needs to be of a size appropriate to your activity, challenging to interpret and large enough to enable you to carry out statistical calculations relating to grouped data. *Opportunities may arise for you to manipulate slightly smaller sets of data - you should not reject these in favour of larger data sets that are less relevant to your activity.* It is essential that there is a relevant and realistic need to group your data - *you are able to produce a large data set by sampling or drawing from a larger set of secondary data.* You need to show that you can interpret compound measures *e.g. milligrams per 100 millilitres, pressure in pounds per square inch (psi), miles per litre / gallon.*

N3.2 Carry Out Calculations

Learning outcome *(EAoNS Specification)*	**You need to know how to:** *(skills needed)*	**Learner guidance** *(guidance on the skills you need)*
N3.2 use the data and information obtained in N3.1 to carry out calculations relevant to a task to do with: A) amounts or sizes B) scales or proportion C) handling statistics D) using formulae	a) show clearly methods of carrying out calculations, justifying levels of accuracy of results b) carry out multi-stage calculations efficiently with numbers of any size c) use powers and roots d) use compound measures e) use mental arithmetic involving numbers, simple fractions and percentages f) calculate missing angles and sides in right-angled triangles from known sides and angles g) calculate with sums of money in different currencies h) calculate, measure, record and compare time in different formats i) estimate, measure and compare dimensions and quantities using metric and, where appropriate, imperial units, and check accuracy of estimates	**carry out multi-stage calculations** 'Multi-stage' - *calculations where the results from one stage are used to provide information for the next stage.* You need to show that you: ▪ can carry out calculations using different methods and are able to work to suitable levels of accuracy, justifying your choice - *stating to what level of accuracy and providing reasons for your choice e.g. 'I decided to record to two decimal places because…'* ▪ can carry out calculations with and without a calculator - *including using mental methods; a calculator must <u>not</u> be used for all calculations* ▪ understand why it is important to check your results ▪ are able to check your methods and calculations in different ways *e.g. by estimating; using a calculator or spreadsheet software* ▪ have checked your results make sense and they are fit for purpose. You also need to show that you can carry out multi-stage calculations

	j) calculate within and between systems and make accurate comparisons k) solve problems involving irregular 2-D shapes l) work out actual dimensions from scale drawings and scale quantities up and down m) work out proportional change n) compare distributions, using measures of average and interquartile range, and estimate mean, median and range of grouped data o) rearrange and use formulae, equations and expressions p) use estimation and other checking procedures to identify and correct errors in methods, calculations and results q) check that results make sense	when working with: **A) amounts or sizes** *e.g.* ▪ *using powers and roots e.g. 'square', 'cube', 'square root', 10^6, 10^{-3}* ▪ *finding missing angles and sides e.g. when working out the space implications for ramps at different slopes, when it is quicker to use calculations rather than scale drawings.* **B) scales or proportion** *e.g.* ▪ *knowing if three dimensions of an object are trebled, its volume or weight becomes 27 times as much / if land measurements on a plan are doubled, the area of land is four times as much.* **C) handling statistics** *e.g. comparing distributions of grouped data:* ▪ *visual e.g. frequency charts, histograms, cumulative frequency graphs* ▪ *numerical e.g. calculations of mean, median and interquartile range.* **D) using formulae** *e.g.* ▪ *using formulae with letters and rearranging them so as to change the subject (output) of a formula, such as making W or h the subject rather than b in b = hW2 as well as finding the value of W given the values of h and b.*

N3.3 Interpret and Present Results and Findings

Learning outcome *(EAoNS Specification)*	**You need to know how to:** *(skills needed)*	**Learner guidance** *(guidance on the skills you need)*
N3.3.1 select two different ways to present results using tables, charts, graphs or diagrams, as appropriate to meet the purpose of a task, and justify choice	a) understand what the results of calculations mean in the context of a problem or task b) select and use appropriate methods to effectively present and illustrate findings, showing trends and making comparisons, including numerical, graphical and written formats c) justify choice of methods of presentation	**select and justify ways to present** Choose more than one appropriate way to present your results to different audiences. Explain and justify why these ways are appropriate to your audience, to the nature of the data you want to present and to the features you want to highlight - *you should give reasons that justify your choice.* All presentations should be labelled *e.g. suitable headings, correctly labelled axes, sensible scales* - and accuracy checked e.g. ▪ complex table (*shows a variety of interrelated data)* ▪ comparative / component bar chart or pie chart ▪ multiple line graph ▪ complex diagram (*shows a variety of interrelated data).*
N3.3.2 present results and findings and justify how they meet the purpose, and are appropriate to task	a) construct complex tables, charts, graphs and diagrams, and label with titles, scales, axes and keys appropriate to purpose and audience b) use more than one way to present results including numerical, graphical and written formats c) justify methods used	**present, explain and justify** You need to show you: ▪ are able to effectively present your findings - *clearly explaining your results, emphasising the key points and justifying how the methods used meet/ or do not meet your purpose* ▪ have supported your conclusions with evidence and assessed the accuracy and dependability of your results, taking into account approximations in calculations and possible

	highlighting main points of findings and explain how far results meet purpose d) draw appropriate conclusions based on findings, including how possible sources of error might have affected results	inaccuracies in the original information. While your results may be based on accurate calculations, they may not *make sense* or be *fit for purpose* in relation to the problem or task you have tackled - you should check this.