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Extract from Specification

Essential Skills Wales

Edexcel Level 3 Essential Skills Wales in Application of Number

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Level 3 Essential Skills Wales in Application of Number

Level:	**3**
Credit value:	**6**
Guided learning hours:	**60**

About this qualification

This is about demonstrating your skills in:

- understanding numerical data (N3.1)
- carrying out calculations (N3.2)
- interpreting results and presenting findings (N3.3)

to tackle problems or tasks that you meet in education, training, work and social roles.

Amplification of evidence requirements

Notes

1 Each level of the skill incorporates and builds on the previous levels. So, for example, in N3.2, the requirement to 'estimate, measure and compare dimensions and quantities' includes choosing and using appropriate units and instruments to measure length, weight, capacity, time and temperature, using standard and non-standard units, all of which are included at lower levels.

2 The subject matter and resources will be more complex than at Level 2 and you must show independence in tackling problems and tasks. You must explain and justify your methods and your conclusions.

3 You must provide evidence of your Application of Number skills, as they are specified in the first column of the component grid. Your evidence must be in the form described in the third column ('Evidence requirements'). In order to provide this evidence, you will need to have the skills that are listed in the second column.

4 The guidance within the qualification supports the requirements of the three columns of the component areas and is intended to advise and help you and your teacher/tutor/trainer in your work. It provides explanations of some of the requirements of the standards that may be useful when you are developing the skill of Application of Number at Level 3 and producing evidence of your work. It is not a mandatory part of the standards.

5 Many learners when producing evidence have found that it is both more interesting and more effective to complete a task or activity that covers all three components (N3.1, N3.2 and N3.3) as a continuous process. However, this is not a requirement.

6 The Mandatory Definitions (*Appendix A*) give the exact meaning of certain words in the document. You must always refer to them when you are developing your skills, gathering evidence, and preparing for assessment.

7 Witness statements must not be the only form of evidence that you provide. When you provide a witness statement, it must be supported by other evidence.

Evidence

At Level 3, you will be assessed via a portfolio of evidence. The term 'evidence' is used in this document to refer to the work you produce for final assessment.

You must demonstrate understanding of the whole process:

- understand and tackle a problem
- collect and interpret data
- carry out calculations
- check results
- interpret results
- present findings
- reflect/review.

You must therefore carry out at least one activity that shows your skills in all three components (N3.1, N3.2, N3.3).

If you need to carry out additional activities to meet all the requirements of N3.2 (a, b ,c, d), each activity must include tasks for:

either

- N3.1 and N3.2

or

- N3.2 and N3.3

but you need to meet only the missing requirement/s.

There must be evidence that all your work has been assessed and authenticated, for example there must be records/notes, written by a competent assessor, confirming that your work is your own and that it has achieved the required standard.

Skill requirements

In order to achieve this qualification, the evidence that you present for assessment needs to demonstrate that you can meet all of the skills requirements of the qualification for each of the component areas. A piece of work submitted could give assessment evidence for more than one skill.

Component: N3.1 Understand numerical data

You must provide evidence that you can:	In order to show that you are competent, you need to know how to:	Evidence requirements
N3.1.1 Identify, analyse and accurately describe at least one practical problem or task that involves a range of numerical data and information.	• identify, analyse and accurately describe the problem or task and its sub-problems.	Evidence must show that the learner has independently identified, analysed and described the problem or task about which they have been briefed or which they have chosen. Evidence must be in the form of notes produced by the learner (by hand or electronically).
N3.1.2 Plan how you will tackle it.	• plan how you will tackle the problem by breaking it down into a series of tasks • plan how you will obtain the data and information you need.	Evidence of planning must include: • details of how the learner intends to obtain relevant data and information • a clear sequence of tasks showing how they intend to use this information. Evidence must be in the form of notes produced by the learner (by hand or electronically).

You must provide evidence that you can:	In order to show that you are competent, you need to know how to:	Evidence requirements
N3.1.3 Collect relevant numerical data and information from a range of sources to meet the purpose of your task. Your sources must include at least **two** of a table, a chart, a graph or a diagram, of which at least one must be complex, and a large data set.	• read, understand and extract information from tables, diagrams, charts and graphs • collect, obtain, read, understand, select and record relevant data and information from different sources, including at least one data set of a size appropriate to a planned activity, and use this to meet the purpose of the activity • make accurate and reliable observations over time and use suitable equipment to measure in a variety of appropriate units • group data into classes of width appropriate to the data • use estimation to help you plan, multiplying and dividing numbers of any size • read and understand ways of writing very large and very small numbers • understand compound measures.	Evidence must include data/information collected from at least three sources, one of which must be an appropriate data set. Evidence must show that the learner can: • collect relevant data and information • group the data appropriately • explain how the data and information meet their purpose • explain how they used the data. Evidence must include: • copies of source material • details of the site/s of observation/measurement • records of data and information obtained.

Component: N3.2 Carry out calculations

You must provide evidence that you can:	In order to show that you are competent, you need to know how to:	Evidence requirements
N3.2.1 Choose and use appropriate methods to get the results you need and justify the methods you have used.	• identify and design methods that are appropriate for your task and justify your choice.	Evidence must show that the learner can: • independently choose and use appropriate methods for getting the results they need • explain why these methods are appropriate. Evidence must be in the form of notes produced by the learner (by hand or electronically).
N3.2.2 Use the data and information you have obtained to carry out calculations relevant to your task to do with: a) amounts or sizes b) scales or proportion c) handling statistics d) using formulae.	• carry out calculations clearly showing your methods • justify the levels of accuracy you have worked to • carry out multi-stage calculations with numbers of any size • use powers and roots • use compound measures • use mental arithmetic involving numbers, simple fractions, and percentages • work out missing angles and sides in right-angled triangles from known sides and angles	Evidence must show that the learner: • has used data and information from N3.2.1 • has used their grouped data • is clear about the purpose and relevance of their calculations.

You must provide evidence that you can:	In order to show that you are competent, you need to know how to:	Evidence requirements
N3.2.2 ***continued***	• calculate with sums of money in different currencies • calculate, measure, record and compare time in different formats • estimate, measure and compare dimensions and quantities using metric and, where appropriate, imperial units, and check the accuracy of estimates • calculate within and between systems and make accurate comparisons • draw 2D representations of simple 3D objects • solve problems involving irregular 2D shapes • work out actual dimensions from scale drawings and scale quantities up and down • work out proportional change • compare distributions, using measures of average and range, and estimate mean, median and range of grouped data	Overall, evidence of calculations must include at least one example from each category: a) amounts or sizes b) scales or proportion c) handling statistics d) using formulae and must show how the learner has checked their methods and calculations. Evidence must show methods and levels of accuracy, with justifications. Evidence must include records of how the learner has checked: • their methods and calculations • that the results make sense in relation to the purpose of the task. Evidence must be in the form of written notes produced by the learner (by hand or electronically).

You must provide evidence that you can:	In order to show that you are competent, you need to know how to:	Evidence requirements
N3.2.2 ***continued***	• rearrange and use formulae, equations and expressions • make multi-step calculations efficiently • use checking procedures to identify and correct errors in methods, calculations and results • check that your results make sense.	

Component: N3.3 Interpret results and present findings

You must provide evidence that you can:	In order to show that you are competent, you need to know how to:	Evidence requirements
N3.3.1 Select and justify two different ways to present your results, using charts or graphs, and tables or diagrams appropriate to your audience.	• understand what the results of your calculations mean in the context of your problem or task • select and use appropriate methods to present and illustrate your findings, showing trends and making comparisons, including numerical, graphical and written formats • justify your choice of methods of presentation.	Evidence must show that the learner can • choose how to present their results using two appropriate ways (for example charts and/or graphs, and tables and/or diagrams) • explain and justify why these ways are appropriate to their audience. Evidence must be in the form of written notes produced by the learner (by hand or electronically).

You must provide evidence that you can:	In order to show that you are competent, you need to know how to:	Evidence requirements
N3.3.2 Present and explain your methods and findings and justify how they meet the purpose of your task and are appropriate to your audience.	• construct and label tables, charts, graphs and diagrams using accepted conventions • describe and justify your choice of methods • describe what your results tell you • draw appropriate conclusions based on your findings, including how possible sources of error might have affected your results • explain how far your results meet your purpose • respond constructively to feedback.	Evidence must show that the learner can • present their methods and findings effectively • explain and justify the methods they have used • describe and explain what the results of their calculations mean in relation to the problem/task they have tackled. Evidence must be in the form of written notes produced by the learner (by hand or electronically). Whether or not ICT is used to produce graphics, evidence must show that the learner has checked their accuracy and can explain them fully. Evidence of this understanding may be in the form of a witness statement. Evidence must show that the learner has received feedback and has responded constructively.

Guidance for Application of Number Level 3

The guidance below supports the requirements of the three columns of the component areas and is intended to advise and help you and your teacher/tutor/trainer in your work. It provides explanations of some of the requirements of the standards that may be useful when you are developing the skill of Application of Number at Level 3 and producing evidence of your work. It is not a mandatory part of the standards.

N3.1.1

Problem

At this level, problems must include sub-problems. The techniques you need to tackle the problem must be relatively sophisticated (for example interrelated multi-stage calculations rather than those that require two or more separate steps), and must require you to consider carefully the nature and sequence of tasks when you are planning how to obtain and use information to meet your purpose. Problems must offer different possible approaches which you must evaluate to decide how best to tackle the problem.

If you choose to tackle a problem of your own, rather than one given by your teacher/tutor/trainer, you must take their advice about whether your chosen problem is appropriate.

N3.1.2

Plan

You need to know to break down an activity into a series of interrelated tasks, and identify the problems to be tackled. It may not be immediately clear what these problems are, and you may need to extend your knowledge of methods and approaches. You will need to take time to 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 (for example methods you will use for organising data, such as tabulating and grouping, types of calculations, how you will take account of variability or bias) to meet the purpose of your activity.

N3.1.3

Collect, record

You must know how to select and use suitable equipment for making accurate measurements and observations, as well as how to interpret a variety of numerical, written and graphical material, including complex tables and charts, (ie those that present very detailed information relating to a large data set), in order to decide about their relevance to the purpose of your activity. You must record measurements and observations accurately and in a way that is fit for the purpose of your task.

Sources

Sources can include graphical and/or written material (for example reference books and journals; organisations that collate their own statistical information; the internet; and newspapers) and/or direct measurements or observations, depending on the context in which you are working. This material must include at least two of: a table, a chart, a graph, or a diagram. You must be able to deal with scales, such as 1:1250 (as on large-scale maps), graphs with several graph lines on the same axes (for example power outputs compared with speed for different temperatures, weights against heights for a range of body mass indexes).

Data set

The 'large data set' must be of a size appropriate to your activity, sufficiently complex to be challenging to interpret, and large enough to enable you to carry out statistical calculations relating to grouped data. Where you compare two sets of data, one set must have been obtained by you, while the other set may have been given to you. A set of about 50 items is likely to be appropriate at this level but, if opportunities arise in your normal work to manipulate slightly smaller sets of data for a worthwhile purpose, 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 the data.

You may produce a large data set by sampling or drawing from a larger set of secondary data.

Compound measures

You must know how to interpret compound measures, for example those presented as 'something per something' such as milligrammes per 100 millilitres, or pressure in psi, or miles per litre/gallon.

N3.2.1

Identify and design methods

You must consider a range of possible methods (for example look up formulae, information relating to similar tasks or problems), weigh up the pros and cons of alternatives, possibly adapt or originate new methods, and be able to justify your choice in relation to its suitability for your purpose and circumstances.

N3.2.2

Carry out multi-stage calculations

Application of Number requires you to show that you can carry out a number of different types of calculations (amounts or sizes; scales or proportion; handling statistics; using formulae). 'Amounts or sizes' is a single category. 'Scales or proportion' is another single category. From each of these categories, you must present at least one example as evidence.

You must show that you can carry out multi-stage calculations, ie where the results from one stage are used to provide some of the data for the next stage, for example finding the mean time taken by shoppers at checkouts, and using the results, together with data about the number of shoppers in the supermarket, to calculate the number of checkout assistants required at different times of the day (this differs from Level 2 in that each stage might include calculations involving two or more steps, for example adding and dividing to find the mean).

You must be able to carry out calculations both with and without a calculator.

Examples of calculations in each category:

a) **amounts or sizes**
Using powers and roots, such as 'square', 'cube' and 'square root', 106, 10-3; finding missing angles and sides, such as when working out the space implications for ramps at different slopes, when it is quicker to use calculations than scale drawings

b) **scales or proportion**
Knowing that, if land measurements on a plan are doubled, the area of land is four times as much, or, if three dimensions of an object are trebled, its volume or weight becomes 27 times as much

c) **handling statistics**
Using several methods (visual, such as frequency charts, histograms or cumulative frequency graphs; numerical, such as calculations of mean, median and interquartile range) to compare distributions of grouped data

d) **using formulae**
Solving simultaneous linear equations with two variables, 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.

Levels of accuracy

You must decide what levels of accuracy to work to (for example 'nearest whole number', 'nearest pound', 'one place of decimals') and be able to justify your choice.

Multi-stage

Where you use the results from one stage to provide data for calculations at the next stage, the stages can involve calculations from any of the four categories.

Use checking procedures

You must always check the accuracy of your calculations. This is often a mental process and you do not have to produce evidence every time you do it. Where there is a series of calculations of the same type, you must record evidence of checking at least the first few of each type. For the remainder, accurate results should confirm that you have checked effectively. You must be aware of the importance of checking your results and your methods and be familiar with different methods of carrying out checks.

Check that results make sense

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 that you have tackled. You must check this.

N3.3.1

Select and justify

You must be able to identify, describe and consider different ways to present your results (for example graphs, chart, tables, diagrams) to at least two different audiences. You must choose and use the two ways (ie charts and/or graphs, **and** tables and/or diagrams) that are most appropriate to your actual audience, to the nature of the data you want to present, and to the features you want to highlight. You must be able to give reasons that justify your choice.

Evidence that you have considered different ways and that explains your choice must be in the form of notes, written by hand or electronically.

N3.3.2

Describe and justify

You must be able to describe your methods and justify them in relation to the problem you have tackled.

Draw appropriate conclusions

At this level, not only must you support your conclusions with evidence, but you must also assess the accuracy and dependability of the results, taking into account approximations in calculations and possible inaccuracies in the original information.

Respond constructively

You must be able to respond constructively to feedback, whether it is positive or negative, for example by being assertive rather than aggressive or dismissive.

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