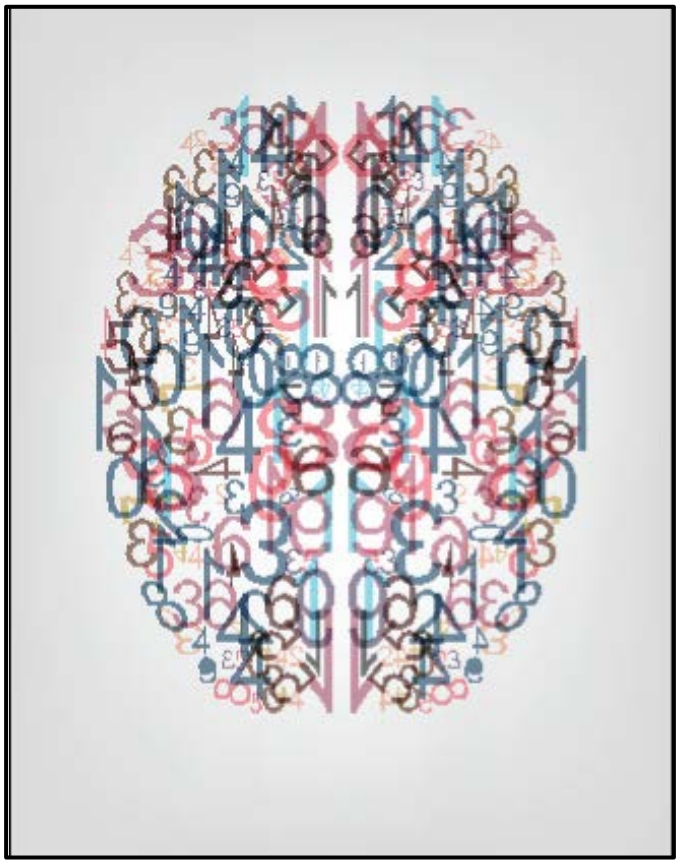
Additional Support Notes

Numeracy (National 4) Unit
Additional learning and teaching Support Notes



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

April 2013, draft version 1.0

Contents

Introduction

These support notes are not mandatory. They provide additional advice and guidance on approaches to learning and teaching programmes in the National Numeracy Unit at SCQF level 4.

These are intended for teacher and lecturers and should be read in conjunction with the:

- Numeracy (National 4) Unit Specification
- Numeracy (National 4) Unit Support Notes

And where the National Numeracy Unit is part of the National 4 Course in Lifeskills Mathematics:

- National 4 Lifeskills Mathematics Course Specification
- National 4 Lifeskills Mathematics Course Support Notes

And where the National Numeracy Unit is part of the National 4 Course in Mathematics:

- National 4 Mathematics Course Specification
- National 4 Mathematics Course Support Notes

Additional support

In this package, the aim is to offer additional support to teacher/lecturers by clarifying what we understand to be usual practice in aspects of learning and teaching.

This is not designed to be something extra for learners to undertake. This package aims to enhance the support for Numeracy (National 4) Unit in its coverage of Core Skill: Numeracy at SCQF Level 4. The learning and teaching approaches mentioned here are not exhaustive and are for guidance only.

The skills that are being clarified and exemplified are:

- problem solving involving two stage number calculations
- presenting information in appropriate graphical forms

Responsibility of all

All practitioners have responsibility for the development of learners' numeracy. How this takes place will vary depending on the context or subject area. All Centres should have strategies in place to ensure there is a shared understanding of professional roles, how learners progress in numeracy and of sound approaches to numeracy teaching and learning.

Approaches to learning and teaching using graphical information

For each skill, three learning and teaching ideas will be exemplified in the following ways:

- standalone
- from across learning
- in a vocational context

Skill 1: Problem solving involving two stage calculations

When solving a problem, learners should decide which calculations are to be carried out, and the order in which to carry them out — eg add then multiply. At this level, learners should show that they can carry out calculations to solve problems requiring *at least two* stages to arrive at an answer.

We shall look at three learning and teaching ideas on problem solving in the following section. The first occurs as a standalone situation, the second occurs in a situation from across learning, and the third occurs in a vocational context.

Learning context: Standalone

In this type of situation, it would be suitable to use a straightforward situation involving money, ie paying for items in a shop and receiving change. Learners could be encouraged to do this without the use of a calculator.

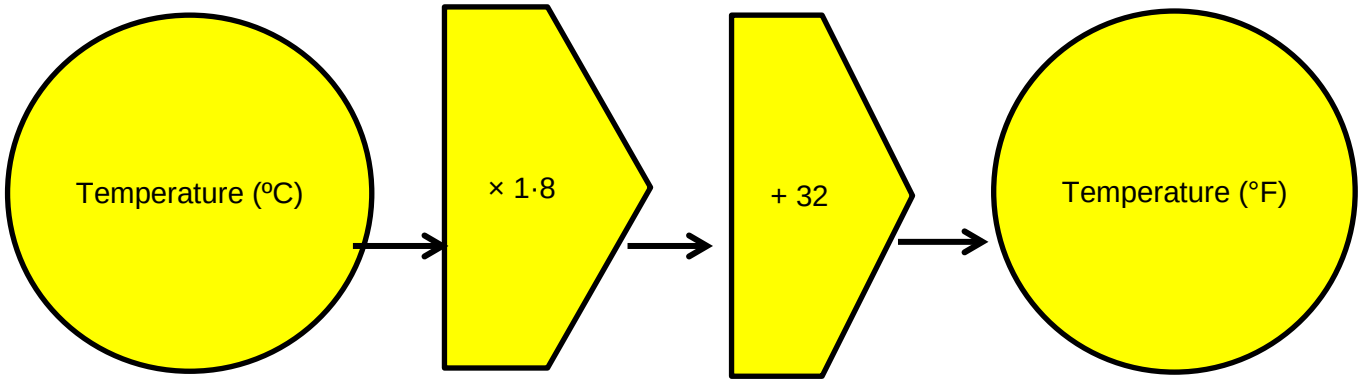
EXAMPLE
Marie buys a Sunday newspaper for £2·40 and a bar of chocolate for 99p in the local newsagent's shop. How much change will she receive if she pays for these items with a £10 note?

NOTE TO TEACHER/LECTURER: Although this may seem a very straightforward example, learners have to add and subtract (or do successive subtractions) as well as dealing with the mixture of units (pounds and pence). This makes it appropriate for Numeracy at SCQF level 4.

Learning context: Across-learning situation

Various interdisciplinary ideas involving cookery, finance and science could form the basis for projects. The area of food preparation is one in which a two stage formula is often used, e.g. to cook a small turkey, allow 45 minutes per kilogram plus 20 minutes. Similarly, in the area of finance, you could consider the purchase of an item on hire purchase where a deposit is paid followed by a fixed number of payments. The example below is taken from science. Remember: a calculator may be used in Numeracy Units.

EXAMPLE
The formula below can be used to convert the temperature from degrees Celsius (°C) to degrees Fahrenheit (°F).



Convert 25ºC to degrees Fahrenheit.

NOTE TO TEACHER/LECTURER: It would be interesting to ask learners to use the formula to work backwards, eg convert 86°F to degrees Celsius. This is still a two stage process, but with extra difficulty.

Learning context: Vocational

EXAMPLE
Riley earns £6·40 per hour. He is paid time and a half for working overtime. How much will he earn if he works three hours overtime?

Skill 2: Presenting information in appropriate graphical forms

In Numeracy (National 4), learners should be able to communicate information in at least one of the following: straightforward tables, graphs, charts or diagrams.

Three learning and teaching ideas related to graphs are given below, one standalone, one from across learning, and one in a vocational context.

One example deals with communicating information in a table, one in a diagram and one in a graph. The example involving a table also involves number skills.

Surveys could form a part of this area of study, ie learners could show the results of a survey in an appropriate format for others to read and make comparisons. Possible ideas for surveys could involve sport (comparing the number of goals scored in comparable leagues such as England, Spain and Italy), science (comparing heights of boys and girls at different ages) and politics (investigating the views of people on topics of interest both nationally and locally).

Graphs such as distance-time graphs, stem and leaf diagrams and scattergraphs could be used to illustrate data, with guidance, in addition to more familiar graphs.

Learning context: Standalone

EXAMPLE
Mr McIntyre is planning to buy some spa treatments for a present.
The cost of the spa treatments is shown below.

Spa treatment	Cost (£)
Back massage	48
Express facial	30
Deluxe manicure	35
Aromatherapy	20
Foot treatment	25

Mr McIntyre wants to:

- buy three different treatments
- spend a maximum of £100 on treatments.

One combination of spa treatments that Mr McIntyre can afford is shown in the table below.

Back Massage £48	Express Facial £30	Deluxe Manicure £35	Aromatherapy £20	Foot Treatment £25	Total Cost
	✓	✓		✓	£90

Complete the table to show **all** possible combinations that Mr McIntyre can afford.

NOTE TO TEACHER/LECTURER: Learners should be encouraged to check that they do not repeat the combination already given or repeat one of their own combinations.

Learning context: Across-learning situation

As mentioned earlier, surveys from areas such as sport, science and politics could be carried out. Learners could discuss appropriate ways of presenting the data. The following example asks learners to illustrate the results of a survey on the heights of a group of boys in a stem and leaf diagram.

EXAMPLE
The heights, in centimetres, of a group of 16-year old boys were recorded. The results are listed below.

168	163	177	170	158	158	154	171	175
160								
183	175	177	160	161	157	155	158	161
174								

Illustrate the data in a stem and leaf diagram.

NOTE TO TEACHER/LECTURER: Learners should show the number of items (*n* = 20) and a key to explain the meaning of individual entries. Possible extensions could involve finding the median or, if this is done as part of a survey, comparing the results with the heights of a group of 16-year old girls. This would give learners the opportunity to compare two sets of data on a back-to-back stem and leaf diagram. Comparing data sets could then cover other elements of the Lifeskills Mathematics and Mathematics N4 course.

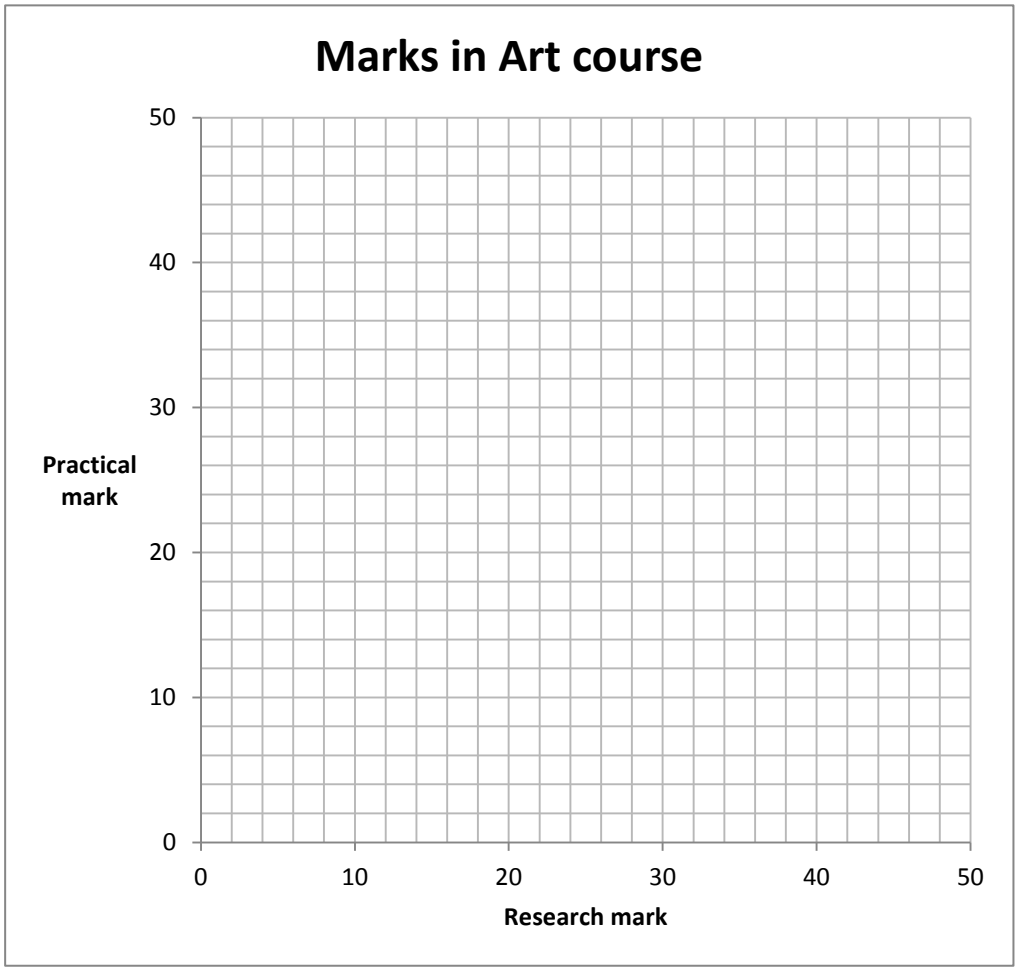
Learning context: Vocational

A scattergraph is a useful way of illustrating two related values such as height and weight. In Numeracy (National 4) Unit, learners should be able to plot points on a grid to form a scattergraph, add a line of best fit and use the line to predict outcomes. Various ideas in a vocational context could be explored, eg the cost of petrol and the distance from a population centre, the age of a car and its value, etc. The example below is taken from the area of education.

EXAMPLE
Learners studying an Art course at college receive 50% of their marks from a research assignment and 50% from a practical activity. Their marks are listed below.

(a) Their teacher/lecturer decides to illustrate this data on a scattergraph. Use the information in the table to draw the scattergraph.

Individual	A	B	C	D	E	F	G	H	I	J
Research mark	40	28	34	44	16	22	38	30	20	24
Practical mark	34	32	40	44	20	32	40	28	30	26



(b) Draw a line of best fit on your scattergraph.

(c) Use the line of best fit to predict the Practical mark for a learner who has a Research mark of 36.

NOTE TO TEACHER/LECTURER: Scattergraphs are also part of the National 4 Mathematics Relationships Unit and Lifeskills Mathematics Managing Finance and Statistic Unit.

Appendix: Reference documents

The following reference documents will provide useful information and background.

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

Administrative information

Published: April 2013 (draft version 1.0)

History of changes to Advanced Higher draft Course/Unit Support Notes

Course details	Version	Description of change	Authorised by	Date