QUALIFICATION HANDBOOK

Certificates in Mathematics (3850-01, 02, 03)

July 2016 version 2.2

City & Guilds

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Contents

1 Introduction

Background

Mathematics is a vital skill needed by people in their everyday lives. City & Guilds Certificate in Mathematics (3850) scheme is suitable for a wide range of ages and abilities from pupils at school and trainees to adults who wish to improve their number skills and may be looking to a fresh start in employment.

The scheme has been designed to help learners build up their confidence in handling numbers and mathematical concepts. It aims to encourage motivation by emphasising a greater involvement in the practical use of number skills rather than a more traditional study of mathematics.

The origins of the scheme were linked to a systematic research project into the number skills of people in employment and into the standards of Mathematics of students progressing into further or higher education courses. The results led to syllabus and assessment provision by City & Guilds which has been added to and revised over a period of approximately 30 years.

This present scheme has now pulled together these lines of development into a single, progressive scheme covering three stages with the options of either external assessment, or for the first three stages, internal assessment based on coursework. Just three external assessments.

Structure

The scheme is structured in three stages with continuous progression of number concepts and skills with their everyday applications demonstrated through practical examples.

Stage 1 introduces basic concepts and skills which are developed and added to in subsequent stages. At Stage 3 a sufficient range of general mathematical concepts and skills will have been acquired to give a firm basis for progressing to further study or for applying skills in everyday life.

Use of calculator

Knowledge of and use of the calculator is encouraged from the earliest stage. However, the calculator is not allowed in written examinations, up to and including Stage 3.

This is to ensure that learners can demonstrate mental calculation in their use of number before using the calculator as an aid with more complex calculations.

Use of the word `Level' and `Stage' in this handbook

In this handbook, the term 'Stage' forms part of the qualification title and indicates progression through the qualification suite, eg Stage 1, Stage 2, Stage 3.

The term 'Level' is used more broadly/generically by City & Guilds, in most qualifications and qualification documentation, to indicate degree of difficulty.

Publications

This handbook includes examination specifications for the multiple-choice question papers at each stage.

Sample question papers, covering all stages, are available on the City & Guilds website.

2 Centre requirements

Approval

This section outlines the approval processes for centres to offer these qualifications and any resources that Centres will need in place to offer the qualifications including qualification-specific requirements for centre staff.

Only approved organisations can offer City & Guilds qualifications. Organisations approved by City & Guilds are referred to as centres.

Centres must meet a set of quality criteria including:

- provision of adequate resources, both physical and human
- clear management information systems
- effective assessment and quality assurance procedures
- effective Learner support
- reliable recording systems.

Centre staff should familiarise themselves with the structure, content and assessment requirements of the qualification[s] before designing a course programme.

An organisation that has not previously offered City & Guilds qualifications must apply for approval to become a centre. This is known as the **Centre Approval Process** (**CAP**). Centres also need approval to offer a specific qualification. This is known as the **Qualification Approval Process** (**QAP**). In order to offer this qualification, organisations which are not already City & Guilds centres must apply for centre and qualification approval at the same time. Existing City & Guilds centres not already delivering the existing 3850 Certificate in Mathematics will only need to apply for qualification approval for this particular qualification.

Full details of the procedures and forms for applying for centre and qualification approval are given in *Centre guide – Delivering International Qualifications*, which is available from City & Guilds' international Branch offices, the City & Guilds website or the International Customer Relations team in our London office.

In countries where City & Guilds has a Branch office, support will be available for new centres. They will appoint an External Verifier. They will also provide details of fees applicable for approvals. The Branch office will be the point of contact for all enquiries for these qualifications and will be responsible for monitoring the delivery and assessments through reports submitted by External Verifiers.
In all other countries, centres wishing to apply for centre or qualification approval should contact the Customer Relations Team in our London office.

City & Guilds reserves the right to withdraw qualification or centre approval for reasons of debt, malpractice or non-compliance with City & Guilds' policies, regulations, requirements, procedures and guidelines, or for any reason that may be detrimental to the maintenance of authentic, reliable and valid qualifications or that may prejudice the name of City & Guilds.

Further details of reasons for suspension and withdrawals, procedures and timescales, are contained in *Centre guide – Delivering International Qualifications*.

Appointment of local examinations secretary

An establishment recognised as an approved centre must appoint a local examinations secretary/single contact to whom all communications will be sent by City & Guilds, and who will make arrangements for the conduct of City & Guilds examinations and assessments at the centre.

3 Assessments, records and results

Assessments

The assessments related to the certificates are listed below. Specifications and syllabuses are given later in this handbook.

All assessments are written multiple choice papers.

Written paper assessment

Stage 1

- 3850-101 Written paper (multiple-choice) 2 hours

Stage 2

- 3850-102 Written paper (multiple-choice) 2 hours

Stage 3

- 3850-103 Written paper (multiple-choice) 2 hours

The provision and conduct of assessments

Assessments are conducted in accordance with City & Guilds' Regulations for the Conduct of Exams (V.5. Oct 2015). If there is any inconsistency between the subject regulations set out in this handbook and the current Regulations, the latter prevails.

The dates of the written paper (multiple-choice) assessments, set and marked by the Institute, are given on the Walled Garden.

Entry for assessments

The selection of learners for the course is at the discretion of the centre. No previous educational qualifications are required.

Learners entering through centres which have directed their preparation (whether by attendance at the centre, co-operation with another institution, accreditation of prior learning or by open learning methods), are internal learners. Others may enter as external learners provided they are able to meet the assessment requirements. Their applications must be received by the centre through which the entry is to be made well in advance of the date of the examination series concerned. This enables them to implement any advice about assessment arrangements or about further preparation they may be given.

Learners attempting Stage 1, Stage 2 or Stage 3 do not have to be assessed at previous stages, but are expected to be competent at these stages.

Examination regulations

Examination: **multiple-choice**

Entries for the examination must be made through an approved centre by the relevant date and will be accepted for internal and external learners.

All learners successful in the multiple-choice written papers will receive a certificate.

Notification of learners' results and certificates will be issued through the centre at which the learners entered. Any correspondence must be conducted through the centre.

Centres will receive consolidated results lists detailing the performance of all the learners they enter, whether they are successful or not.

4 Preparing learners

Aims of the scheme

The general aims throughout the three stages are to assist learners to acquire:

- confidence in their own abilities
- understanding of and facility with number
- the ability to use number skills in a variety of applications
- a firm basis for further study in mathematics, vocational courses and employment.

Each stage has its own specific content as shown in the syllabuses. Selected comments on each stage are given below.

Stage 1

Stage 1 aims to establish a sound understanding of number concepts and applications. The important concept of number itself can be developed through such activities as sorting, classifying and forming number patterns. The simple common fractions $\frac{1}{2}$ $\frac{1}{4}$ and their decimal fraction equivalents are given with everyday examples.

Activities involving number and measurement are included to establish the need for standard units.

The everyday uses of simple pictograms, tables, charts and graphs can introduce variety to a visual appreciation of number.

Shape and space activities introduce learners to an understanding of the concepts of perimeter, area and volume.

The operations of addition, subtraction, multiplication and division should be applied to simple whole numbers, decimal and common fractions with practical examples. A calculator can be used at this stage in the classroom for 'harder' number exercises to emphasise the importance of the correct order of operations, estimating and checking answers.

Stage 2

The range of whole numbers, decimal and common fractions, is extended at this stage as is the range of standard units in the measurement of mass, length, capacity and time.

Shape and space concepts are extended and more formal calculations of perimeter, area and volume of simple rectilinear shapes are included.

Pie charts are added and the depth of interpretation demanded of tables, charts and line graphs is greater than at Stage 1.

New topics introduced are percentages, ratio and proportion and the generalisation of number to simple algebra.

Stage 3

The range of numbers is again broadened and includes standard form but the numbers are such that operations on them do not require the use of a calculator. For operations on common and decimal fractions the objectives clearly distinguish between numbers where multiplication and division cause an increase or decrease.

The conceptual demands of the topics introduced at Stage 2, ie percentage, ratio and proportion and algebra are increased. In algebra the idea of gradient as a rate of change is included.

Elementary statistics has been added as a topic and clear examples of progression are given. The same bar chart, for example, is used as at Stage 2, but the conceptual demand of the application is increased. Examples of progression such as this can be seen in other topics.

Shape and space includes the use of Pythagoras' theorem, extends calculations to the circumference and area of a circle and to the volume of solids with constant cross section. The basic ideas of similarity are also introduced.

Designing courses of study

Selection of learners for courses is the responsibility of centres. There are no formal entry requirements so it is likely that learners will have varying degrees of competence. The rate of learning within the group will also vary. For these reasons it is recommended that the units should be offered in a flexible way according to the abilities of individual learners and that groups of learners taking different stages may be accommodated together. Whenever possible an individualised workshop/assignment approach to teaching should be adopted.

As long as the aims of the scheme are met, and the learners attain the required competence, the detailed structure and length of courses of study are a matter for the individual centre.

5 Units

This section of the handbook provides guidance to support the delivery of this qualification.

It includes:

- City & Guilds unit name and number
- Level
- Learning outcomes with related assessment criteria

Unit 101 Number

Level:	Stage 1
Relationship to other standards:	This unit links to the National Standards for Mathematics where applicable.
Aim:	The aim of this unit is to develop skills in working with whole numbers to a thousand and decimal fractions to hundredths. The learner will also recognise common decimal and fraction equivalencies for halves and quarters.

Learning outcome
The learner will: 1. Understand how to work with numbers of different sizes.
Assessment criteria
The learner can: 1.1 recognise numbers, sort and order objects 1.2 count objects using one-to-one correspondence 1.3 explore simple number patterns 1.4 use a symbol to stand for an unknown number 1.5 write numbers in words and figures in the decimal system 1.6 recognise decimal fraction and common fraction equivalences for halves and quarters 1.7 use the ideas of rounding and approximation.

Unit 101 Number

Guidance

Mathematical content	Sample context
To meet the assessment criteria for this learning outcome learners need to know how to	Learners might:
1.1 recognise numbers, sort and order objects • recognise numbers • sort objects • order numbers • sequence numbers	• recognise the number on a street sign/bus/room; odd and even number (houses in a street) • sort plates according to size; • coins according to value. • arrange bills/statements in date order • arrange invoices in sequence • select the fifth fastest time • select the second lowest score.
1.2 count objects using one-to-one correspondence	• count the number of people in a room.
1.3 explore simple number patterns	• use square numbers eg Draw the pattern for the next square number:  • use triangular numbers eg complete the next number in the triangular sequence: 1 3 6 10 1521 • use simple sequences eg complete the next number in the sequence: 2 4 6 8
1.4 use a symbol to stand for an unknown number	• find missing numbers that are represented by a symbol eg: 7 + ? = 10 2 x ■ = 12 $\frac{8}{\blacklozenge} = 4$
1.5 write numbers in words and figures in the decimal system ranging from units of thousands to hundredths	• write a cheque to pay a bill. • recognise that 75¢ is the same as $0.75
1.6 recognise decimal fraction and common fraction equivalences for halves and quarters	• recognise that 0.25 m is the same as ¼ m • recognise that 0.5 kg is the same as ½ kg.
1.7 use the ideas of rounding and approximation	• find the smallest value single coin that could be used to buy a tin of beans costing 42¢.

Unit 102 Measurement and standard units

Level:	Stage 1
Relationship to other standards:	This unit links to the National Standards for Mathematics where applicable.
Aim:	The aim of this unit is to develop skills in estimating, measuring and recording length, time, mass, capacity and temperature. The learner will also develop skills in following and giving directions and instructions.

Learning outcome
The learner will: 1. Understand how to work with measures.
Assessment criteria
1.1 The learner can: 1.2 measure length 1.3 estimate length 1.4 follow/give directions and instructions 1.5 tell the time 1.6 use units of time in everyday contexts 1.7 measure mass 1.8 estimate mass 1.9 measure capacity 1.10 estimate capacity 1.11 measure temperature 1.12 use temperature facts 1.13 relate different units of measure.

Unit 102 Measurement and standard units

Guidance

Mathematical content	Sample context
To meet the assessment criteria for this learning outcome learners need to know how to:	Learners might:
1.1 measure length using everyday units of length: • imperial: inches, feet, yards • metric: millimetres, centimetres, metres.	• measure own waist and write the measurement down. • measure the height of a door using a steel rule or a tape measure and write the measurement (to the nearest cm/mm)
1.2 estimate length	• estimate the length of a wall • estimate the height of a bookcase • check estimates by measuring.
1.3 follow/give directions and instructions using the following terms: A quarter rotation turn, half, three-quarters and a complete rotation turn. Clockwise and anticlockwise North, south, east and west (four main compass points). Left and right, vertical, horizontal, parallel, right-angle.	• follow/give instructions for undoing bottle tops, spray dispensers and joining threaded pipes • state where one town is in relation to another - to the North, South, East or West • give driving and/or walking instructions eg turn left at the end of the road; turn right in 100m.
1.4 tell the time by reading analogue and digital clocks and watches	• tell the time to the nearest minute or second depending on the instrument used • write down the time.
1.5 use units of time in everyday contexts: minutes, hours, days, weeks, months and years	• estimate the time taken for a variety of activities • solve problems involving time eg a bus should arrive at 9.15am. If the bus is twenty minutes late at what time does it arrive?
1.6 measure weight in everyday units: gram, kilogram	• weigh objects eg themselves or a parcel and write down the weight • weigh out ingredients eg for making a cake.

Unit 102 Measurement and standard units

Guidance

Mathematical content	Sample context
1.7 estimate and compare weights	• use a balance to compare objects and guess the heavier • practice lifting different weights of common items, for example 5 kg of potatoes • estimate weights in cooking and shopping.
1.8 measure capacity in everyday units: millilitres, litres, teaspoon, tablespoon, cup	• pour a litre of water into a variety of containers (as in cooking, gardening, DIY) • measure out 15 ml using a 5ml teaspoon (as in medicine, cooking, gardening).
1.9 estimate capacity	• estimate and compare the capacity of differently shaped containers
1.10 measure temperature in everyday units: °F Fahrenheit (F)	• measure own temperature and write it down in °F (to the nearest degree) • measure and keep a record of daily room temperature.
1.11 use temperature facts in °F	• state the freezing point of water • state the boiling point of water • state body temperature • compare temperatures in different parts of the country/different countries • estimate the temperature outside • work out what items can be cooked together in an oven at a certain temperature.
1.12 relate different units of measure within a system for a. length b. weight c. capacity d. time (as presented in the glossary)	• compare two lengths when one is given in centimetres and the other in metres • compare the weight of two items • compare the capacity of two containers. • convert times on the 12 hour standard clock to the 24 hour clock and vice-versa.

Note: Use the instruments available as a basis for discussion

a. of the selection of appropriate instruments for the tasks
b. to convey the ideas of approximation and accuracy.

Unit 103 Pictograms, tables, charts and graphs

Level:	Stage 1
Relationship to other standards:	This unit links to the National Standards for Mathematics where applicable.
Aim:	The aim of this unit is to develop skills in reading and constructing simple pictograms, tables, bar charts and graphs. Learners will also read common banking documentation.

Learning outcome
The learner will: 1. Understand how to read and construct pictograms, tables, charts and graphs.
Assessment criteria
1.1 The learner can: 1.2 read simple pictograms 1.3 construct simple pictograms 1.4 read simple tables 1.5 construct simple tables 1.6 read simple bar charts 1.7 construct simple bar charts 1.8 read simple graphs 1.9 construct simple graphs 1.10 read common banking documentation.

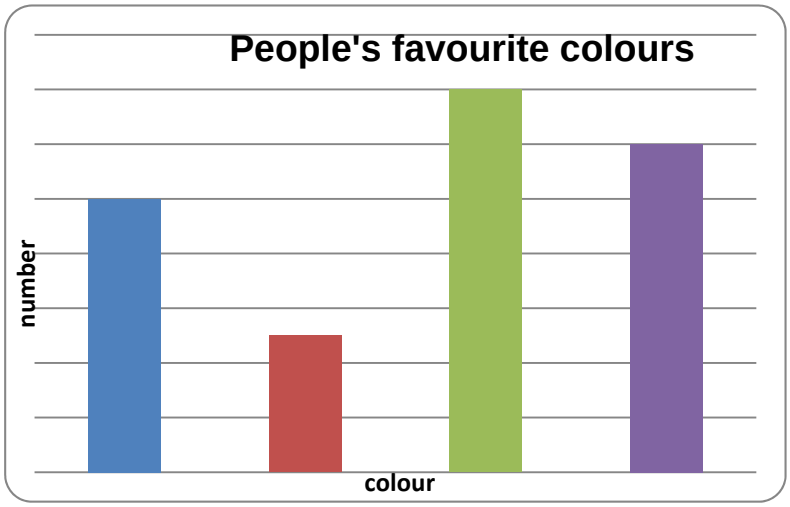
Unit 103 Pictograms, tables, charts and graphs

Guidance

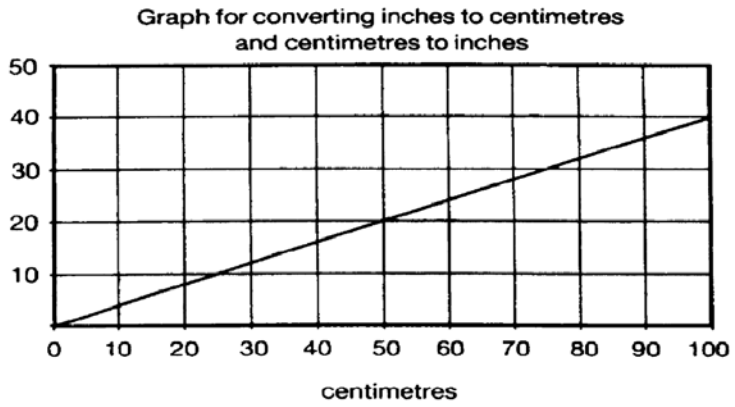
<table>
<tr><th>Mathematical content</th><th>Sample context</th></tr>
<tr><td>To meet the assessment criteria for this learning outcome learners need to know how to:</td><td>Learners might:</td></tr>
<tr><td>1.1 read simple pictograms</td><td>
• extract information from a simple pictogram, eg
<table>
<tr><td colspan="2">Favourite flavours of ice cream chosen by a group of students.</td></tr>
<tr><td>Chocolate</td><td>  </td></tr>
<tr><td>Vanilla</td><td>  </td></tr>
<tr><td>Lemon</td><td>  </td></tr>
<tr><td>Banana</td><td>  </td></tr>
<tr><td>Strawberry</td><td>  </td></tr>
</table>
 = 1 choice of ice cream

• How many students chose banana?
</td></tr>
<tr><td>1.2 construct simple pictograms</td><td>• carry out a survey to find out students' favourite television programmes. Construct a pictogram to show this information.</td></tr>
</table>

<table>
<tr><th>Mathematical content</th><th>Sample context</th></tr>
<tr><td>1.3 read simple tables</td><td>• read simple menus, price lists. eg

Price list
<table><tr><td>  </td><td>panini</td><td>$2.00</td></tr><tr><td>  </td><td>jacket potato</td><td>$1.75</td></tr><tr><td>  </td><td>toastie</td><td>$1.00</td></tr><tr><td>  </td><td>hot drink</td><td>$1.50</td></tr><tr><td>  </td><td>chocolate cake</td><td>$1.00</td></tr></table>
How much is a jacket potato?</td></tr>
<tr><td>1.4 construct simple tables</td><td>• carry out a survey to find out what students drink at college. Construct a tally chart/table to show this information.</td></tr>
<tr><td>1.5 read simple bar charts</td><td>• extract information from a simple bar chart, eg
 

How many people said that green was their favourite colour?</td></tr>
</table>

<table>
<tr><th>Mathematical content</th><th>Sample context</th></tr>
<tr><td>1.6 construct simple bar charts</td><td>• construct a bar chart to show how you spend your money: headings might be food, clothes, cell phone, travel, going out.</td></tr>
<tr><td>1.7 read simple graphs</td><td>• extract information from a simple graph, eg
 

How many centimetres are there in 20 inches?</td></tr>
<tr><td>1.8 construct simple graphs</td><td>• construct a simple graph eg from given information
<table><tr><td>Cost of item ($)</td><td>$5</td><td>$10</td><td>$15</td></tr><tr><td>Tax ($)</td><td>$1</td><td>$2</td><td>$3</td></tr></table>
• The table shows how much Tax at 20% has to be paid on the cost of an item. Draw the graph of Tax against cost of item.</td></tr>
</table>

<table>
<tr><th>Mathematical content</th><th>Sample context</th></tr>
<tr><td>1.9 read common banking documentation</td><td>
read or complete common banking information, eg you have three $10 notes, one $5 note, four $1 coins, a 50¢ and a 5¢ coin. Complete the paying-in slip
<table>
<tr><td>$50 notes</td><td></td><td></td></tr>
<tr><td>$20 notes</td><td></td><td></td></tr>
<tr><td>$10 notes</td><td></td><td></td></tr>
<tr><td>$5 notes</td><td></td><td></td></tr>
<tr><td>$1 coin</td><td></td><td></td></tr>
<tr><td>50¢</td><td></td><td></td></tr>
<tr><td>20¢</td><td></td><td></td></tr>
<tr><td>silver</td><td></td><td></td></tr>
<tr><td>bronze</td><td></td><td></td></tr>
<tr><td>TOTAL CASH</td><td></td><td></td></tr>
<tr><td>Cheques, etc</td><td></td><td></td></tr>
</table>
</td></tr>
</table>

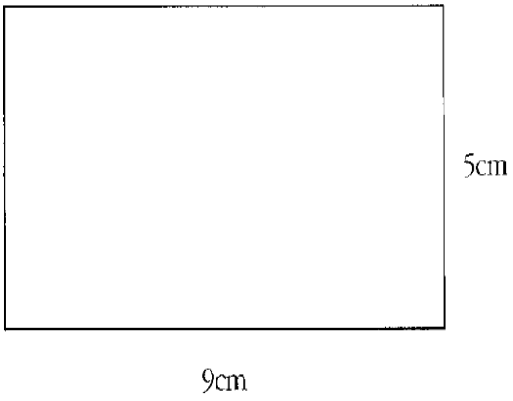
Unit 104 Shape and space

Level:	Stage 1
Relationship to other standards:	This unit links to the National Standards for Mathematics where applicable.
Aim:	The aim of this unit is to develop an understanding of shapes and their properties.

Learning outcome
The learner will: 1. Understand how to read calculate the perimeter, area and volume of different shapes. Learners will also tessellate simple shapes and recognize nets and symmetry.
Assessment criteria
The learner can: 1.1 use a ruler and a pair of compasses 1.2 measure the perimeter of shapes 1.3 calculate the perimeter of rectangular shapes 1.4 tessellate simple shapes 1.5 find the area of rectangular shapes by counting squares 1.6 calculate areas of squares and rectangles where length and breadth are small whole numbers 1.7 recognise nets of cubes and cuboids 1.8 construct cubes and cuboids from nets 1.9 find the volume of cuboids by counting cubes 1.10 use the idea of line symmetry incorporating reflection.

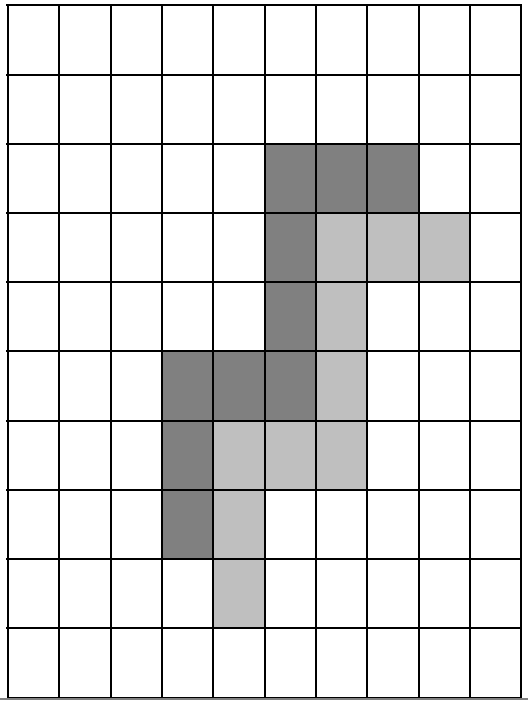
Unit 104 Shape and space

Guidance

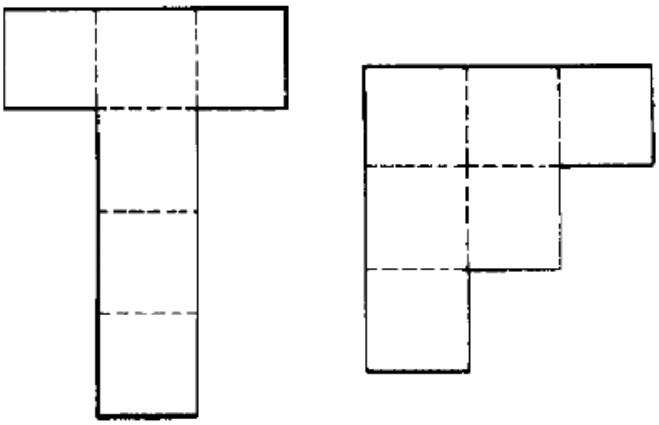
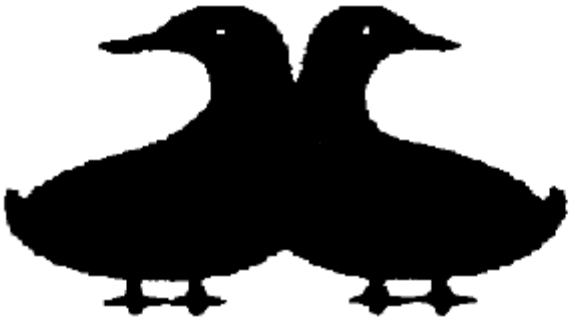
Mathematical content	Sample context
To meet the assessment criteria for this learning outcome learners need to know how to:	Learners might:
1.1 use a ruler and a pair of compasses	• use a ruler to draw a triangle, square and rectangle • use a pair of compasses to draw a circle
1.2 measure the perimeter of shapes, knowing that perimeter is: a. the distance around the outside of a shape b. a measure of length	• measure the perimeter of a rectangular table • measure a circular flower bed to calculate a path.
1.3 calculate the perimeter of rectangular shapes	• calculate the perimeter of different shapes, eg  What is the perimeter of the rectangle?

Unit 104 Shape and space

Guidance

Mathematical content	Sample context
1.4 tessellate simple shapes	• continue patterns, eg 
1.5 find the area of rectangular shapes by counting squares. They know that area: a. involves the idea of surface filling b. has two dimensions and that the units of measure are square units	• find the area of a floor using carpet tiles • find the area of a plan and a grid of squares (simple plan only: scale 1cm to 1m)
1.6 calculate the areas of squares and rectangles where length and breadth are small whole numbers	• calculate the area of a rectangular carpet that measures 4m X 3m • calculate the area of a square of metal with side 6cm

Unit 104 Shape and space
Guidance

Mathematical content	Sample context
1.7 recognise nets of cubes and cuboids	• Identify the characteristics of a cube or cuboid and select the correct net for a given shape, eg Which one of the following nets would make a cube? 
1.8 construct cubes and cuboids from nets	• construct a cube or cuboid from a given net and identify their characteristics
1.9 find the volume of cuboids by counting cubes	• find the volume of a box by constructing it and using appropriate unit cubes. • Learners will know that volume a. involves the idea of filling space b. has three dimensions and that the units of measure are cubic units
1.10 use line symmetry	• draw a line of symmetry, eg through the picture below. • use a mirror to check a line of symmetry. 

Unit 105 Operations on whole numbers less than ten thousand

Level:	Stage 1
Relationship to other standards:	This unit links to the National Standards for Mathematics where applicable.
Aim:	The aim of this unit is to develop skills in addition, subtraction, multiplication and division with and without the use of a calculator.

Learning outcome
The learner will: 1. Understand how to add, subtract, multiply and divide whole numbers less than 10000
Assessment criteria
The learner can: 1.1 add without the use of a calculator 1.2 add with the use of a calculator 1.3 subtract without the use of a calculator 1.4 subtract with the use of a calculator 1.5 multiply a number with up to three digits by a single digit number without the use of a calculator 1.6 multiply with the use of a calculator 1.7 divide a number with up to three digits by a single digit number where the answer is a whole number without the use of a calculator 1.8 divide with the use of a calculator.

Unit 105 Operations on whole numbers less than ten thousand

Guidance

Mathematical content	Sample context
To meet the assessment criteria for this learning outcome learners need to know how to:	Learners might:
1.1 add without the use of a calculator, eg 5 + 10 + 7	• add the total of three costs without the use of a calculator, eg for an evening out: fares cost $5 meal costs $10 cinema costs $7 What is the total cost of the evening out?
1.2 add with the use of a calculator, eg 264 + 153 + 82	• add the total of three costs with the use of a calculator, eg an expense form is made up of travel by car $264 hotel cost $153 meals $82 What is the total expense?
1.3 subtract without the use of a calculator	• subtract cost without the use of a calculator, eg How much change should be given when a bill of $26 is paid with a $50 note?
1.4 subtract with the use of a calculator	• subtract with the use of a calculator, eg a factory has 314 employees. 47 workers are away ill. How many employees are not away ill?
1.5 multiply a number with up to 3 digits by a single digit number without the use of a calculator	• multiply without the use of a calculator, eg A roll of stamps has 500 stamps. How many stamps are there on 5 rolls?
1.6 multiply a number with up to 3 digits by a single digit number with the use of a calculator	• multiply with the use of a calculator, eg a man travels 18 kilometres in total to and from work each day. In a year he travels to work 221 times. How many kilometres does he travel in a year?
1.7 divide a number with up to 3 digits by a single digit number where the answer is a whole number without the use of a calculator	• divide without the use of a calculator, eg share $550 equally between 5 people
1.8 divide with the use of a calculator	• divide with the use of a calculator, eg a park gardener has 2460 plants which will be shared equally between 12 flower beds. How many plants will be used in each flower bed?

Unit 106 Operations on decimal fractions involving tenths and hundredths

Level:	Stage 1
Relationship to other standards:	This unit links to the National Standards for Mathematics where applicable.
Aim:	The aim of this unit is to develop skills in addition and subtraction of decimal fractions with and without the use of a calculator. Learners will also complete simple multiplication and division calculations with and without the use of a calculator.

Learning outcome
The learner will: 1. Understand how to add, subtract, multiply and divide decimal fractions.
Assessment criteria
The learner can: 1.1 add without the use of a calculator 1.2 add with the use of a calculator 1.3 subtract without the use of a calculator 1.4 subtract with the use of a calculator 1.5 multiply by a whole number without the use of a calculator 1.6 multiply by a whole number with the use of a calculator 1.7 divide by a whole number without the use of a calculator 1.8 divide by a whole number with the use of a calculator.

Unit 106 Operations on decimal fractions involving tenths and hundredths

Guidance

Mathematical content	Sample context
To meet the assessment criteria for this learning outcome learners need to know how to:	Learners might:
1.1 add without the use of a calculator	• add two decimal numbers without the use of a calculator, eg What is the total mass of two packs of vegetables of mass 1.5 kg and mass 2.2 kg respectively?
1.2 add with the use of a calculator	• add two decimal numbers with the use of a calculator, eg This week a person has earnings of $156.49 and overtime of $47.95. What is the total pay?
1.3 subtract without the use of a calculator	• eg How much material is left on a roll of 36 m after 5.25 m are cut off?
1.4 subtract with the use of a calculator	• eg A camera costs $129.90. When a deposit of $12.99 is paid, how much is still owing?
1.5 multiply by a whole number up to and including 10 and by 100 without the use of a calculator	• multiply a decimal number (tenths, hundredths) by a whole number, eg Electricity units cost 7.8¢ each. Find the cost of using 100 units
1.6 multiply by a whole number with the use of a calculator	• multiply a decimal number (tenths, hundredths) by a whole number up to and including 10 and 100 with the use of a calculator, eg Electricity units cost 7.8¢ each. Find the cost of using 234 units.
1.7 divide (by a whole number up to and including 10, without the use of a calculator	• divide a decimal number (tenths, hundredths) by a whole number up to and including 10, where the answer is a whole number or a decimal number (tenths, hundredths) without the use of a calculator, eg Six theatre tickets cost $214.20; how much does one ticket cost?
1.8 divide by a whole number with the use of a calculator.	• divide by a whole number with the use of a calculator, eg Sixteen people went on a trip which cost in total $547.20. How much should each person pay when the cost is shared equally?

Unit 107 Operations on common fractions involving halves and quarters

Level:	Stage 1
Relationship to other standards:	This unit links to the National Standards for Mathematics where applicable.
Aim:	The aim of this unit is to develop skills in addition and subtraction of halves and quarters. Learners will also multiply and divide to find halves and quarters.

Learning outcome
The learner will: 1. Understand how to add, subtract, multiply and divide using common fractions.
Assessment criteria
The learner can: 1.1 add 1.2 subtract 1.3 multiply or divide using phrases such as 'half of', 'quarter of'.

Unit 107 Operations on common fractions involving halves and quarters

Guidance

Mathematical content	Sample context
To meet the assessment criteria for this learning outcome learners need to know how to:	Learners might:
1.1 add halves and quarters	• add halves and quarters, eg Potato fritters need $\frac{1}{2}$ teaspoon of salt and the tomato relish needs $\frac{1}{4}$ teaspoon of salt. How much salt is needed altogether?
1.2 subtract halves and quarters	• subtract halves and quarters, eg How much milk is left in a 2 litre carton after three quarters of a litre has been used?
1.3 multiply or divide using phrases such as 'half of', 'quarter of'	• Multiply or divide using halves and quarters, eg A car has a 40 litre petrol tank. It is half full. • How much petrol is needed to fill it up? ($\frac{1}{2}$ x 40 or $\frac{40}{2}$)

Unit 108 Appropriate strategies and use of the calculator

Level:	Stage 1
Relationship to other standards:	This unit links to the National Standards for Mathematics where applicable.
Aim:	The aim of this unit is to develop skills in recognising the operations required to solve a problem and strategies for checking. The learner will also use simple mathematical terms.

Learning outcome
The learner will: 1. Understand how to use appropriate strategies and mathematical terms
Assessment criteria
The learner can: 1.1 recognise the operations required to solve a problem 1.2 use checking strategies 1.3 use mathematical terms in everyday conversation.

Unit 108 Appropriate strategies and use of the calculator

Guidance

Mathematical content	Sample context
To meet the assessment criteria for this learning outcome learners need to know how to:	Learners might:
1.1 recognise the operations required to solve a problem	• recognise the operations required to solve different problems throughout the course, eg five people decide to share (equally) the cost of a present. The present costs $37.50. What calculation do I need to do to find out how much each person should pay? The required calculation might be $37.50 ÷ 5. • investigate the importance of the order of operations. Order does not matter for addition problems but it does for subtraction. eg 30 + 5 = 5 + 30 30 – 5 does not equal 5 - 30 • investigate the importance of the order of operations. Order does not matter for multiplication problems but it does for division. eg 30 X 5 = 5 X 30 $\frac{30}{7}$ = 5 does not equal $\frac{7}{30}$
1.2 use checking strategies	• use different checking strategies: o use a calculator when it is appropriate. In the first instance a calculator could be used to check calculations which have been carried out on paper or mentally o perform the calculation in a different way, eg 30 + 5 could be recalculated as 5 + 30 o roughly estimate the answer o judge if the answer is sensible o be aware that not all calculators work in the same way. The operating procedure varies from one manufacturer to another, so it is important to read very carefully the instruction booklet which accompanies the calculator.
1.3 use mathematical terms	• use mathematical terms in everyday conversation. eg 'less than', 'equal to', 'greater than' `approximately'.

Syllabus Stage 2

Unit 201 Place value

Level:	Stage 2
Relationship to other standards:	This unit links to the National Standards for Mathematics where applicable.
Aim:	The aim of this unit is to develop skills in working with whole numbers to a million and decimal fractions to thousandths.

Learning outcome
The learner will: 1. Understand how to write numbers in words and figures and distinguish between numbers of different magnitude.
Assessment criteria
The learner can: 1.1 write numbers in words and figures in the decimal system 1.2 distinguish between two numbers of different magnitude.

Unit 201 Place value

Guidance

Mathematical content	Sample context
To meet the assessment criteria for this learning outcome learners need to know how to:	Learners might:
1.1 write numbers in words and figures in the decimal system. The range of numbers will be restricted to numbers from units of millions to thousandths.	• write a cheque for $4345.76 • write large numbers such as a company profit of $1.7m as a whole number of dollars • write down in figures 'three thousandths of a metre'.
1.2 distinguish between numbers of different magnitude. The numbers for comparison will be restricted to numbers from units of millions to thousandths.	• distinguish between numbers of different magnitude eg In which of the following numbers does the 3 have a value of three tenths? a. 5203 b. 520.3 c. 5.203 d. 52.03

Unit 202 Measurement and standard units

Level:	Stage 2
Relationship to other standards:	This unit links to the National Standards for Mathematics where applicable.
Aim:	The aim of this unit is to develop skills in using imperial and metric units for length, mass and capacity including converting units from one system to the other. Learners will also work with units for time and temperature.

Learning outcome
The learner will: 1. Understand how to work with different imperial and metric units and convert between systems
Assessment criteria
The learner can: 1.1 use imperial units still in use today using conversions 1.2 use metric units, including converting from one unit to another 1.3 convert imperial units to metric units 1.4 use units of time in everyday contexts 1.5 use units of temperature in everyday contexts.

Unit 202 Measurement and standard units

Guidance

Mathematical content	Sample context
To meet the assessment criteria for this learning outcome learners need to know how to:	Learners might:
1.1 use imperial units using conversions. The units for assessment will be: • length - inches, feet, yards and miles • weight - ounces, pounds and stones • capacity - pints and gallons (conversions between these units will be given).	• convert the drop of a curtain measured as 5 feet into inches. (12 inches = 1 foot) • convert a recipe that requires half a pound of flour into ounces. (16 ounces =1 pound) • convert 45 gallons of milk into pints. (8 pints = 1 gallon).
1.2 use metric units, including converting from one unit to another. The metric units used for assessment will be: • length - millimetres, centimetres, metres, kilometres • weight - grams, kilograms • capacity - millilitres, centilitres, litres.	• work out how many 500 mm wide kitchen units a carpenter needs to fill a space of 2 metres • estimate the length of a car in metres • work out how many 500 g bags a pet shop owner can fill from a 15 kg sack of dry cat food • estimate the weight of a parcel in kilograms • how many 200 ml containers can be filled from a bottle containing 1 litre of juice? • estimate the capacity of a bottle in centilitres.
1.3 convert imperial units to metric units using the approximations given below. Approximate Imperial/metric conversions: Length • 1 inch is slightly more than 2.5 cm. • 1 yard is slightly less than one metre. • five eighths of a mile is approximately equal to 1 kilometre. Weight • 2 lb is slightly less than 1 kg. Capacity • 2 pints is slightly more than 1 litre.	• convert a sweater size from 40 inches to centimetres for a customer • decide if a piece of material 5 metres long is big enough for a curtain that needs 5 yards of material. • work out approximately how many kilometres are in 5 miles • work out approximately how many kilograms there are in a sack of potatoes that weighs 55 lb • convert a recipe that requires one pint of stock into litres.

Unit 202 Measurement and standard units

Guidance

Mathematical content	Sample context
1.4 use units of time in everyday contexts. The units used for assessment will be: seconds, minutes and hours (including the 12 hour and 24 hour clock), months, years, leap years.	• Use standard time conventions for planning and scheduling events consisting of three or four activities eg: A person describes the journey to work as follows: It takes 10 minutes to walk to the bus stop. The bus journey is 40 minutes. It takes a further 15 minutes to get to work. What is the minimum travel time in hours and minutes? Write a plan to show a personal work routine Produce a plan for preparation of a meal. • Work out time differences eg: • Time in New York is 5 hours behind Greenwich Mean Time (GMT). When it is 1300 hours GMT, what time is it in New York?
1.5 use units of temperature in everyday contexts (Celsius unit).	• decide whether 5°C is the sort of temperature to be expected in July.

Unit 203 Operations on whole numbers

Level:	Stage 2
Relationship to other standards:	This unit links to the National Standards for Mathematics where applicable.
Aim:	The aim of this unit is to develop skills in addition, subtraction, multiplication and division of whole numbers without the use of a calculator. The learner will also use a combination of two operations.

Learning outcome
The learner will: 1. Understand how to work with addition, subtraction, multiplication and division of whole numbers without the use of a calculator including combination of two operations.
Assessment criteria
The learner can: 1.1 add and subtract numbers, without a calculator 1.2 multiply a number with up to four digits by a number with up to two digits, without a calculator 1.3 divide a number with up to four digits by a number with up to four digits where the answer is a whole number or involves an exact decimal with no more than two decimal places, without a calculator 1.4 use a combination of two operations from addition, subtraction, multiplication, division to solve problems, without a calculator.

Unit 203 Operations on whole numbers

Guidance

Mathematical content	Sample context
To meet the assessment criteria for this learning outcome learners need to know how to:	Learners might:
1.1 add and subtract numbers up to one million, without a calculator.	• calculate the total attendance at a Test Match given the daily figures • calculate the cost of a house less the deposit.
1.2 multiply a number with up to four digits by a number with up to two digits, without a calculator.	• work out how many sheets of paper are needed to print twenty-five copies of a 226 page report, using one sheet per page.
1.3 divide a number with up to four digits by a number with up to two digits where the answer is a whole number or involves an exact decimal with no more than two decimal places, without a calculator.	• work out how many coaches are needed for 364 people when one coach seats 52 people
1.4 use a combination of two operations from addition, subtraction, multiplication, division to solve problems, without a calculator.	• work out how much is left from a budget of $2500 when the following purchases are made: a laptop costing $879 and a colour printer costing $279.

Unit 204 Operations on decimal fractions

Level:	Stage 2
Relationship to other standards:	This unit links to the National Standards for Mathematics where applicable.
Aim:	The aim of this unit is to develop skills in addition, subtraction, multiplication and division operations on decimal fractions without the use of a calculator. The learner will also use a combination of two operations.

Learning outcome
The learner will: 1 Understand how to work with addition, subtraction, multiplication and division operations on decimal fractions without the use of a calculator including combination of two operations.
Assessment criteria
The learner can: 1.1 add and subtract two numbers with not more than three decimal places, without a calculator 1.2 multiply a number with up to four digits and not more than two decimal places by a whole number with up to two digits, without a calculator 1.3 divide a number with not more than four digits and two decimal places by a whole number with up to two digits, without a calculator. The answer must be an exact decimal with not more than two decimal places 1.4 use a combination of at least two operations from addition, subtraction, multiplication, division to solve problems, without a calculator.

Unit 204 Operations on decimal fractions

Guidance

Mathematical content	Sample context
To meet the assessment criteria for this learning outcome learners need to know how to:	Learners might:
1.1 add and subtract two numbers with not more than three decimal places, without a calculator.	• add up charges on a bill \$3.75 + \$16.50 • check change \$100 – \$65.25 • find the total length of material required 3.275m + 2.5m.
1.2 multiply a number with up to four digits and not more than two decimal places by a whole number with up to two digits, without a calculator	• work out the total cost of 35 litres of fuel costing \$2.13 per litre.
1.3 divide a number with not more than four digits and two decimal places by a whole number with up to two digits, without a calculator. the answer must be an exact decimal with not more than two decimal places	• work out the cost of electricity per week from an electricity bill of \$1363.05 for a quarter (12 weeks)
1.4 use a combination of at least two operations from addition, subtraction, multiplication, division to solve problems, without a calculator	• work out the extra cost to buy an item on credit terms eg **\$250.00 CASH** **or** **CREDIT TERMS** **\$25.00 deposit plus** **12 monthly payments of \$27.50**

Unit 205 Operations on common fractions

Level:	Stage 2
Relationship to other standards:	This unit links to the National Standards for Mathematics where applicable.
Aim:	The aim of this unit is to develop skills in calculating with common fractions.

Learning outcome
The learner will: 1 Understand how to work with common fractions to find a fraction of a quantity, equivalent fractions and add and subtract simple fractions.
Assessment criteria
The learner can: 1.1 calculate a common fraction of a quantity 1.2 use equivalent common fractions 1.3 add and subtract 'simple' common fractions.

Unit 205 Operations on common fractions

Guidance

Mathematical content	Sample context
To meet the assessment criteria for this learning outcome learners need to know how to:	Learners might:
1.1 calculate a common fraction of a quantity, without a calculator. Common fractions involved will be halves, quarters, tenths, hundredths and thirds	• work out the discount on a $75 jacket in a sale offering 'one third off'.
1.2 use equivalent common fractions	• use $\frac{1}{2} = \frac{2}{4} = \frac{3}{6} = \frac{4}{8} = \frac{5}{10}$
1.3 add and subtract 'simple' common fractions without a calculator. Using halves, quarters, fifths, eighths, tenths and hundredths. In any question one denominator will be a factor of the other.	• work out the total weight of a shopping bag which contains 2kg of potatoes, 1kg of apples, half a kilogram of tomatoes and three-quarters of a kilogram of grapes.

Unit 206 Percentages

Level:	Stage 2
Relationship to other standards:	This unit links to the National Standards for Mathematics where applicable.
Aim:	The aim of this unit is to develop skills in expressing simple numerical information as percentages and calculating percentages of numbers.

Learning outcome
The learner will: 1. Understand how to express simple numerical information as percentages and calculate percentages of numbers.
Assessment criteria
The learner can: 1.1 express simple numerical information as a percentage 1.2 calculate 1%, 5%, 10%, 20%, 25%, 50% and 75% of numbers.

Unit 206 Percentages
Guidance

Mathematical content	Sample context
To meet the assessment criteria for this learning outcome learners need to know how to:	Learners might:
1.1 express simple numerical information as a percentage which when represented as a common fraction would have a denominator of 2, 4, 10, 20, 50 or 100.	• work out the percentage failure rate, when there are 3 failures in a sample of 100 • work out the percentage of batteries used when 4 batteries are used from a pack that contained 16 batteries.
1.2 calculate 1%, 5%, 10%, 20%, 25%, 50% and 75% of numbers.	• work out a 5% pay rise on an income of $650 • work out how many more units will be produced per week if production increases by 20%. Current production is 2000 units per week.

NB. Learners should **not** rely on the percentage button to solve these calculations

Unit 207 Conversions between common fractions, decimal fractions and percentages

Level:	Stage 2
Relationship to other standards:	This unit links to the National Standards for Mathematics where applicable.
Aim:	The aim of this unit is to develop skills in recognising equivalencies of common fractions, decimal fractions and percentages and converting common fractions to decimal fractions

Learning outcome
The learner will: 1. Understand how to recognise equivalencies of common fractions, decimal fractions and percentages and convert common fractions to decimal fractions.
Assessment criteria
The learner can: 1.1 recognise the equivalences of common fractions, decimal fractions and percentages 1.2 convert common fractions to decimal fractions.

Unit 207 Conversions between common fractions, decimal fractions and percentages

Guidance

Mathematical content	Sample context
To meet the assessment criteria for this learning outcome learners need to know how to:	Learners might:
1.1 recognise the equivalences of common fractions, decimal fractions and percentages involving common fractions with denominators of 2, 4, 5, 10 and 100.	• Express $\frac{1}{4}$ as a percentage • express half an hour as a decimal fraction • express a 75% reduction as a fraction.
1.2 convert common fractions to decimal fractions (up to three decimal places).	• convert three-eighths to a decimal fraction • work out who walks further: a person who walks half a kilometre or another person walks 0.45 kilometres.

Unit 208 Orders of magnitude

Level:	Stage 2
Relationship to other standards:	This unit links to the National Standards for Mathematics where applicable.
Aim:	The aim of this unit is to develop skills in rounding numbers

Learning outcome
The learner will: 1. Understand how to round numbers to the nearest whole number, ten, hundred or thousand and to one or two decimal places.
Assessment criteria
The learner can: 1.1 round numbers correct to the nearest whole number, ten, hundred and thousand 1.2 round numbers correctly to one or two decimal places.

Unit 208 Orders of magnitude

Guidance

Mathematical content	Sample context
To meet the assessment criteria for this learning outcome learners need to know how to:	Learners might:
1.1 round numbers correct to the nearest whole number, ten, hundred and thousand	• round to the nearest 100 the seating capacity of a stadium has seating capacity that holds 88548 people • round to the nearest 10 the number of people with appointments at a doctor's surgery. This week there are 463 appointments.
1.2 round numbers correct to one or two decimal places	• read a calculator display giving the number correct to two decimal places.

Unit 209 Ratio and proportion

Level:	Stage 2
Relationship to other standards:	This unit links to the National Standards for Mathematics where applicable.
Aim:	The aim of this unit is to develop skills in reading and using scales on maps and plans and solving simple ratio and proportion problems

Learning outcome
The learner will: 1. Understand how to read and use scales on maps and plans and solve simple ratio and proportion problems.
Assessment criteria
The learner can: 1.1 read and use scales on maps and plans 1.2 use the unitary method to solve simple ratio and proportion problems.

Unit 209 Ratio and proportion

Guidance

Mathematical content	Sample context
To meet the assessment criteria for this learning outcome learners need to know how to:	Learners might:
1.1 read and use scales on maps and plans.	• work out how many kilometres 3 cm represents on a map with a scale of 10 cm = 20 km. • use a scale of 1:50 to draw a plan.
1.2 use the unitary method to solve simple ratio and proportion problems.	• calculate the total cost for a stay when a hotel charges $240 for three nights. How much would ten nights cost at the same rate?

Unit 210 Average and range

Level:	Stage 2
Relationship to other standards:	This unit links to the National Standards for Mathematics where applicable.
Aim:	The aim of this unit is to develop skills in calculating the average and range of a set of data.

Learning outcome
The learner will: 1. Understand how to calculate the average (arithmetic mean) and range of a set of data.
Assessment criteria
The learner can: 1.1 calculate the average (arithmetic mean) of a set of data 1.2 calculate the range of a set of data.

Unit 210 Average and range

Guidance

Mathematical content	Sample context
To meet the assessment criteria for this learning outcome learners need to know how to:	Learners might:
1.1 calculate the average (arithmetic mean) of a set of data.	• calculate a cricketer's average score per match from five one-day matches with scores of 80, 40, 50, 0 and 35 runs.
1.2 calculate the range of a set of data.	• calculate the range of cricketer's runs for five one-day matches with scores of 80, 40, 50, 0 and 35 runs.

Unit 211 Elementary algebra

Level:	Stage 2
Relationship to other standards:	This unit links to the National Standards for Mathematics where applicable.
Aim:	The aim of this unit is to develop skills in solving simple equations.

Learning outcome
The learner will: 1. Understand how to substitute values in an equation and solve simple equations.
Assessment criteria
The learner can: 1.1 substitute values into an equation expressed in words or simple formula 1.2 solve simple equations with one unknown.

Unit 211 Elementary algebra

Guidance

Mathematical content	Sample context
To meet the assessment criteria for this learning outcome learners need to know how to:	Learners might:
1.1 substitute values into an equation expressed in words or simple formula involving one operation (+, –, x, ÷).	• calculate the price of a snack is using selling price = cost of production + profit where the cost of production is 75¢ and the profit is 60¢. • use perimeter = $2L + 2b$ • use area = Lb.
1.2 solve simple equations with one unknown.	• solve $2x+4=7$ • solve $p - 1=5$ • solve $3x - 2 = 25$ • solve $5a + 2 = 37$

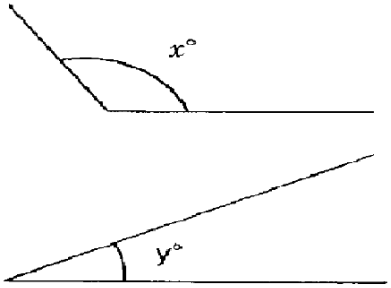
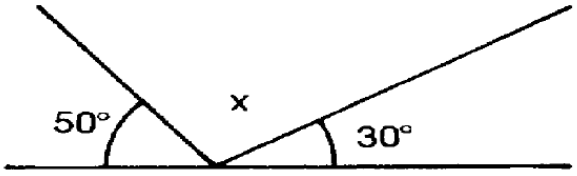
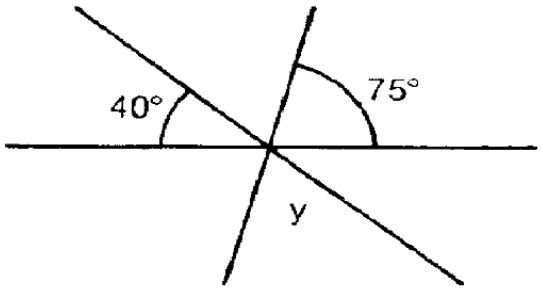
Unit 212 Shape and space

Level:	Stage 2
Relationship to other standards:	This unit links to the National Standards for Mathematics where applicable.
Aim:	The aim of this unit is to develop skills in working with shape and space to find angles and calculating perimeter, area and volume.

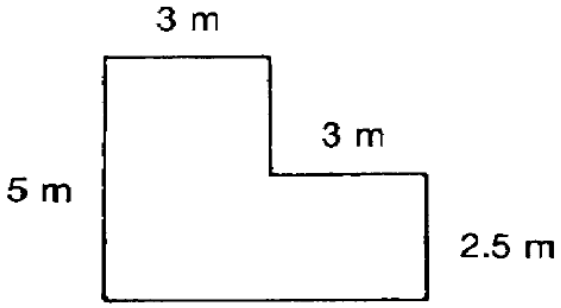
Learning outcome
The learner will: 1. Understand how to work with shape and space to find angles and calculate perimeter, area and volume.
Assessment criteria
The learner can: 1.1 measure an angle to the nearest degree 1.2 use the properties of angles on a straight line and at a point to find the size of an angle 1.3 recognise and draw equilateral and isosceles triangles and sketch cubes, cuboids, cylinders and spheres 1.4 recognise simple transformations 1.5 calculate the perimeter of a rectilinear figure 1.6 calculate the area of a rectilinear figure 1.7 calculate the volume of a cuboid.

Unit 212 Shape and space

Guidance

Mathematical content	Sample context
To meet the assessment criteria for this learning outcome learners need to know how to:	Learners might:
1.1 measure an angle to the nearest degree using a protractor.	• measure the angles x and y 
1.2 use the properties of angles on a straight line and at a point to find the size of an angle.	• calculate the size of the angle marked *x*  • calculate the size of the angle marked *y* 

Unit 212 Shape and space
Guidance

Mathematical content	Sample context
1.3 recognise and draw equilateral and isosceles triangles and sketch cubes, cuboids, cylinders and spheres.	• create a pattern using squares and equilateral triangles. • sketch a cylinder with a height of 10 cm and a radius of 2.5 cm.
1.4 recognise simple transformations	• match congruent shapes
1.5 calculate the perimeter of a rectilinear figure	• calculate the perimeter of the L-shaped room sketched below 
1.6 calculate the area of a rectilinear figure	• identify different rectangles with the same shape. • calculate the area of the L-shaped room shown above
1.7 calculate the volume of a cuboid	• estimate the volume of a rectangular box, height 20 cm, length 50 cm, depth 30 cm • work out the actual volume.

Unit 213 Construct, interpret and use tables of figures, graphs, charts and maps

Level:	Stage 2
Relationship to other standards:	This unit links to the National Standards for Mathematics where applicable.
Aim:	The aim of this unit is to develop skills in constructing and interpreting pictograms, frequency tables, bar charts, pie charts and graphs. Learners will also read maps.

Learning outcome
The learner will: 1. Construct and interpret pictograms, frequency tables, bar charts, pie charts and graphs. Learners will also read maps.
Assessment criteria
The learner can: 1.1 construct and interpret a frequency table with suitable class intervals for discrete data 1.2 extract information from simple tables of figures including timetables 1.3 construct and interpret bar charts 1.4 construct and interpret pictograms 1.5 construct and interpret simple graphs 1.6 construct and interpret pie charts 1.7 read maps.

Unit 213 Construct interpret and use tables of figures, graphs, charts and maps

Guidance

Mathematical content	Sample context
To meet the assessment criteria for this learning outcome learners need to know how to:	Learners might:
1.1 construct and interpret a frequency table with suitable class intervals for discrete data	• find and record the number of learners on a course with birthdays in each month.
1.2 extract information from simple tables of figures including timetables, with two, three or four columns	• find the maximum and minimum recorded temperatures in a day • extract data from weather forecast/record tables. • extract the departure and arrival times from a timetable eg What time is the 2210 from London Liverpool Street due to arrive at Stansted Airport?

London Liverpool Street to Stansted Airport and Cambridge
Saturdays

London Liverpool Street	2158	2210	2228
Tottenham Hale	2210	2222	2240
Cheshunt	2218		2248
Broxbourne	2222		2252
Roydon	2226		
Harlow Town	2230		2258
Harlow Mill	2233		
Sawbridgeworth	2237		2303
Bishops Stortford	2244	2248	2311
Stansted Mountfitchet	2248		2305
Stansted Airport		2257	
Elsenham	2252		
Newport (Essex)	2257		
Audley End	2300		2323
Great Chesterford	2305		
Whittlesford Parkway	2310		2330
Shelford	2314		

Unit 213 Construct interpret and use tables of figures, graphs, charts and maps

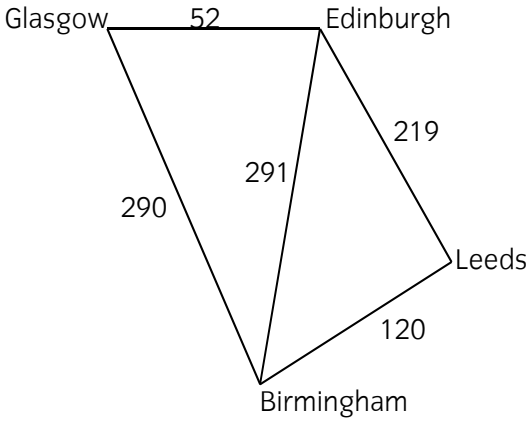
Guidance

Mathematical content	Sample context
1.3 construct and interpret information from bar charts	• construct a bar chart to show marks achieved in each test • interpret information from a bar chart involving two variables (eg time and population)
1.4 construct and interpret information from pictograms.	• find how many laptops were sold in May

1.5 construct and interpret simple graphs.	• describe the speed of the vehicle during the 20-minute period shown
1.6 construct and extract information from pie charts	• find the percentage of the total sales represented by the 'Sales to the UK'

Unit 213 Construct interpret and use tables of figures, graphs, charts and maps

Guidance

Mathematical content	Sample context
1.7 read a map.	• read and extract information from a simple map eg: A person travels from Glasgow to Birmingham direct and back to Glasgow via Leeds. What is the total distance travelled? 

Syllabus Stage 3

Unit 301 Operations on integers

Level:	Stage 3
Relationship to other standards:	This unit links to the National Standards for Mathematics where applicable.
Aim:	The aim of this unit is to develop skills in working with different sets of whole numbers.

Learning outcome
The learner will: 1. Work with different sets of whole numbers including squares, square roots, prime numbers, multiples and factors.
Assessment criteria
The learner can: 1.1 apply the four operations of addition, subtraction, multiplication and division to positive integers in problems relating to everyday life and work, without a calculator 1.2 calculate the squares and cubes of positive integers without a calculator and know the positive square roots of perfect squares up to 144 1.3 express large integers in standard form and express standard form as integers (Examples of standard form using negative indices will not be set) 1.4 use directed numbers in problems relating to everyday life and work 1.5 compare numbers written in the decimal system with other number systems.

Unit 301 Operations on integers

Guidance

Mathematical content	Sample context
To meet the assessment criteria for this learning outcome learners need to know how to:	Learners might:
1.1 recognise the different sets of numbers and apply the four operations of addition, subtraction, multiplication and division to positive integers without the use of a calculator. Learners should be familiar with the terms 'multiples', 'factors', 'prime numbers', 'natural numbers', 'whole numbers', 'integers' and 'positive integers'.	• list the prime numbers up to 20 • write multiples and factors of whole numbers • deduce the inverse of a given number sequence • work out the total amount a customer will pay in three years if he pays $125 per month on credit payments on a car. • work out how much each person receives if a group of 12 friends wins $33,000 in a competition which they share equally.
1.2 calculate the squares and cubes of positive integers without the use of a calculator and know the positive square roots of perfect squares up to 144. Applications for squares, cubes and square roots will come under the sections on area, volume and elementary algebra. The sum of squares can be an introduction to Pythagoras' Theorem.	• evaluate 52 • solve 32 + 42 = • solve 52 + 122 = • solve 142 - 92 = • find the positive square root of 49 • evaluate $\sqrt{49}$=
1.3 express large integers in standard form and express standard form as integers. Only standard form with positive indices will be tested at this level	• write 23 000 in standard form • write 4.9 x 104 as an integer • write the speed of a space craft as an integer eg travelling at a speed of approximately 9.1 x 104 miles per hour. • write the population of Jamaica in standard form. In 2013 it was 2,790,427.

Unit 301 Operations on integers

Guidance

Mathematical content	Sample context
1.4 use directed numbers in problems relating to everyday life and work.	• calculate time in different places using information about time zones • explore transactions on a bank account including debit and credit • work out depth/height relative to sea-level • calculate temperature change below/above freezing eg overnight the temperature changes from -2°C to + 4°C.
1.5 compare numbers written in the decimal system with other number systems.	• write the binary number 1101 in the decimal system • convert 28 days to weeks • convert four yards to feet

Unit 302 Operations on decimal fractions

Level:	Stage 3
Relationship to other standards:	This unit links to the National Standards for Mathematics where applicable.
Aim:	The aim of this unit is to develop skills in working with decimal fractions including using a combination of operations.

Learning outcome
The learner will: 1. Work with decimal fractions including using a combination of operations.
Assessment criteria
The learner can: 1.1 apply the operations of addition and subtraction to decimal numbers without a calculator 1.2 apply the operations of multiplication and division to numbers where the multiplication will increase and the division decrease, without a calculator 1.3 apply the operations of multiplication and division to numbers where the multiplication will decrease and the division increase, without a calculator 1.4 use a combination of operations from addition, subtraction, multiplication and division to solve problems without a calculator.

Unit 302 Operations on decimal fractions

Guidance

Mathematical content	Sample context
To meet the assessment criteria for this learning outcome learners need to know how to:	Learners might:
1.1 apply the operations of addition and subtraction to decimal numbers without a calculator.	• solve 1 − (0.35 + 0.27 + 0.1)
1.2 apply the operations of multiplication and division to numbers where the multiplication will increase and the division decrease, without a calculator.	• find the cost in cents of 1.7 kg of potatoes at 70¢ per kg. • work out how many bags of potatoes, each weighing 2.5 kg, can be filled from a sack containing 55 kg of potatoes
1.3 apply the operations of multiplication and division to numbers where the multiplication will decrease and the division increase, without a calculator.	• find the cost in $ of 1.7 kg of potatoes at $0.70 per kg. • work out how many pieces each 0.75 m long can be cut from a 3.75 m length of wood (assuming there is no wastage).
1.4 use a combination of operations from addition, subtraction, multiplication and division to solve problems without a calculator.	• find the total cost of 1. 5 kg of cheese at $6.00 per kg and 0.25 kg of butter at $8.00 per kg.

Unit 303 Operations on common fractions

Level:	Stage 3
Relationship to other standards:	This unit links to the National Standards for Mathematics where applicable.
Aim:	The aim of this unit is to develop skills in working with common fractions including using a combination of operations.

Learning outcome
The learner will: 1. Work with common fractions including using a combination of operations.
Assessment criteria
The learner can: 1.1 apply the operations of addition and subtraction to common fractions not involving 'borrowing' 1.2 apply the operations of addition and subtraction to common fractions involving 'borrowing' 1.3 apply the operations of multiplication and division to common fractions where the multiplication will increase and division decrease 1.4 apply the operations of multiplication and division to common fractions where the multiplication will decrease and division increase 1.5 use a combination of operations from addition, subtraction, multiplication and division to solve problems.

Unit 303 Operations on common fractions

Guidance

Mathematical content	Sample context
To meet the assessment criteria for this learning outcome learners need to know how to:	Learners might:
1.1 apply the operations of addition and subtraction not involving 'borrowing' to common fractions.	• work out what length of wood remains when 2½ yards is cut from a piece of wood length 4 ¼ yards.
1.2 apply the operations of addition and subtraction involving 'borrowing' to common fractions.	• solve $3\frac{11}{16} + 2\frac{23}{26}$ • solve $4\frac{3}{16} + 2\frac{17}{64}$
1.3 apply the operations of multiplication and division to common fractions where the multiplication will increase and division decrease.	• solve $6\frac{1}{10} \times 1\frac{1}{4}$ • solve $6\frac{1}{10} \div 1\frac{1}{2}$
1.4 apply the operations of multiplication and division to common fractions where the multiplication will decrease and the division will increase.	• solve $2\frac{1}{4} \times \frac{1}{2}$ • solve $\frac{2}{5} \div \frac{1}{2}$ • solve $\frac{1}{3} \times \frac{1}{2}$ • work out the fraction of the whole pie remaining when a pie is cut into thirds and then one of these pieces is cut in half. What fraction of the whole pie is the smaller piece?
1.5 use a combination of operations from addition, subtraction, multiplication and division to solve problems.	• adapt recipes for a different number of people.

Unit 304 Order of operations and use of calculator

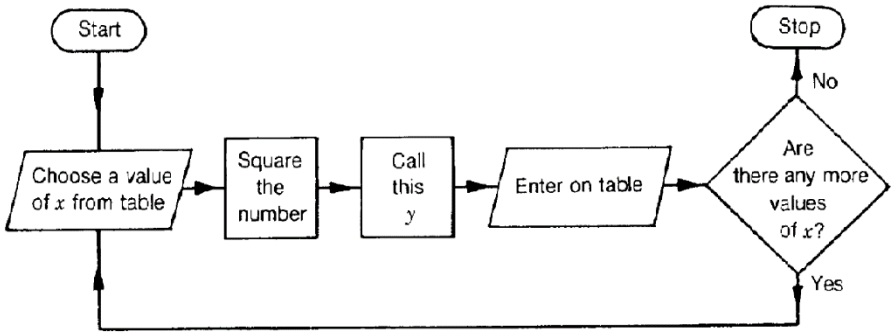
Level:	Stage 3
Relationship to other standards:	This unit links to the National Standards for Mathematics where applicable.
Aim:	The aim of this unit is to develop skills in using the correct order of operations and reading and constructing flow charts.

Learning outcome
The learner will: 1. Use the correct order of operations for calculations and read and construct flow charts.
Assessment criteria
The learner can: 1.1 use the correct order of operations, with and without brackets, for calculations 1.2 read and construct simple flowcharts.

Unit 304 Order of operations and use of calculator

Guidance

Mathematical content	Sample context
To meet the assessment criteria for this learning outcome learners need to know how to:	Learners might:
1.1 use the correct order of operations, with and without brackets, for calculations.	• show in which order the buttons on a calculator should be pressed to find the answer to $58 + 29\frac{7}{8}$ (Assume that the calculator is already cleared and does not contain a memory). • show how $5\frac{1}{2}$ would be represented in the display of a calculator
1.2 read and construct simple flowcharts.	• read or construct a flowchart to show how to complete a table of square numbers with the values of y for each value of x chosen.



Unit 305 Percentages

Level:	Stage 3
Relationship to other standards:	This unit links to the National Standards for Mathematics where applicable.
Aim:	The aim of this unit is to develop skills in calculating and using percentages

Learning outcome
The learner will: 1. Calculate and use percentages.
Assessment criteria
The learner can: 1.1 calculate percentages 1.2 use percentages in a wide range of everyday contexts 1.3 calculate simple and compound interest for two years 1.4 calculate depreciation for two years.

Unit 305 Percentages

Guidance

Mathematical content	Sample context
To meet the assessment criteria for this learning outcome learners need to know how to:	Learners might:
1.1 calculate percentages.	• calculate 6% of 5000
1.2 use percentages in a wide range of everyday contexts. Contexts include: • VAT • tax rates • earnings • discounts • rates of inflation • population statistics • examination marks • tolerances.	• work out new salaries eg the chief executive of a company earns $450 000 and a trainee manager earns $30 000 per annum. Each receives a 5% pay rise. • work out the selling prices for a shirt priced at $24 plus VAT. • work out the minimum and maximum acceptable lengths of bolts produced with overall length 30 mm with a tolerance of ± 2%. • work out how much commission a retailer receives on sales of $5 700 when their commission is 15%. • work out a 15% deposit on a sofa costing $2750
1.3 calculate simple and compound interest. Compound interest is for two applications with no formula	• calculate the interest on a $3 000 loan at 10% simple interest per annum for two years • calculate the interest on a $3 000 loan at 10% compound interest per annum for two years
1.4 calculate depreciation for two years.	• work out the value of a machine with principal cost of $80 000 after two years simple depreciation at 20% per year.

Unit 306 Conversions between decimal fractions, common fractions and percentages

Level:	Stage 3
Relationship to other standards:	This unit links to the National Standards for Mathematics where applicable.
Aim:	The aim of this unit is to develop skills in converting and using decimal fractions, common fractions and percentages.

Learning outcome
The learner will: 1. Convert and use decimal fractions, common fractions and percentages.
Assessment criteria
The learner can: 1.1 convert between decimal fractions, common fractions and percentages and to apply as appropriate 1.2 recognise and use certain commonly used conversions including recurring decimals 1.3 use common fractions, decimal fractions or percentages as appropriate.

Unit 306 Conversions between decimal fractions, common fractions and percentages

Guidance

Mathematical content	Sample context
To meet the assessment criteria for this learning outcome learners need to know how to:	Learners might:
1.1 convert between decimal fractions, common fractions and percentages and to apply as appropriate.	• express 0.48 as a common fraction • express 48% as a common fraction • express 37% as a decimal fraction • express 5/8 as a percentage • express 1.65 as a percentage • work out what percentage of tax a government spends on education when it spends \$0.35 for every \$1 tax received.
1.2 recognise and use certain commonly used conversions including recurring decimals.	• express a reduction of 1/3 in different ways eg $\frac{1}{3}$ = 0.33 (correct to 2 decimal places) or $33\frac{1}{3}$% • work out how much commission at 10% a retailer receives on sales of \$5 700.
1.3 use common fractions, decimal fractions or percentages as appropriate.	• compare prices when shopping, eg these coats were originally \$75 each. Which is now the best buy?
	

Unit 307 Ratio and proportion

Level:	Stage 3
Relationship to other standards:	This unit links to the National Standards for Mathematics where applicable.
Aim:	The aim of this unit is to develop skills in reading and using scales, ratio and proportion.

Learning outcome
The learner will: 1. Read and use scales, ratio and direct and inverse proportion.
Assessment criteria
The learner can: 1.1 read and use scales on maps and plans 1.2 use direct proportion 1.3 use inverse proportion 1.4 write as a ratio the relationship between two quantities.

Unit 307 Ratio and proportion

Guidance

Mathematical content	Sample context
To meet the assessment criteria for this learning outcome learners need to know how to:	Learners might:
1.1 read and use scales on maps and plans.	• work out the actual distance (in km) between two villages. On a map of scale 1 to 75 000 the distance between the villages is represented by a line 6 cm long.
1.2 use direct proportion.	• work out how many Euros would be given in exchange for £10 sterling if 1 Euro = £0.86. • work out how much sand a builder needs to mix with three shovels of cement using a 1:6 mix of cement to sand. • work out how many sweets a girl and her brother will get each if they share 15 sweets in the ratio 3:2.
1.3 use inverse proportion eg 'halving and doubling.	• calculate how long it will take to complete a journey of an average speed of 36 kph when the same journey takes six hours at an average speed of 30 kph. • use the statement 'Pressure is inversely proportional to volume' to explain what happens to volume when pressure is doubled.
1.4 write as a ratio the relationship between two quantities.	• express in its simplest form the ratio a catering assistant applies when he mixes 3 parts cordial to 12 parts water to make a drink.

Unit 308 Measurement and standard units

Level:	Stage 3
Relationship to other standards:	This unit links to the National Standards for Mathematics where applicable.
Aim:	The aim of this unit is to develop skills in using metric and imperial measures of mass, length, area, volume and capacity and measure temperature and time in everyday contexts.

Learning outcome
The learner will: 1. Use metric and imperial measures of mass, length, area, volume and capacity and measure temperature and time in everyday contexts.
Assessment criteria
The learner can: 1.1 use both the metric and Imperial measures of mass, length, area, volume/capacity, use temperature °F 1.2 use time in everyday contexts.

Unit 308 Measurement and standard units

Guidance

Mathematical content	Sample context
To meet the assessment criteria for this learning outcome learners need to know how to:	Learners might:
1.1 use metric measures of mass, length, area and volume/capacity: and temperature in °F, in appropriate situations.	• measure length: eg material, wallpaper • measure weight: eg food; parcels • calculate volume eg cylinders • calculate capacity eg paint • calculate area: eg flooring, garden • measure and record temperature: eg minimum office temperatures, washing temperatures • work out how many 300 g packs of birdseed a shopkeeper can make from 10 kg. How much is left over? • estimate the average height of a man.
1.2 use time in everyday contexts.	• Plan journeys in different time zones eg: The time in San Francisco is three hours behind Kingston. When it is 19:30 in San Francisco, what time is it in Kingston?

Unit 309 Reading and interpreting tables of figures, dials and scales

Level:	Stage 3
Relationship to other standards:	This unit links to the National Standards for Mathematics where applicable.
Aim:	The aim of this unit is to develop skills in extracting information from tables of figures and reading dials and scales.

Learning outcome
The learner will: 1. Extract information from tables of figures and reading dials and scales.
Assessment criteria
The learner can: 1.1 extract information from tables of figures 1.2 read dials and scales on measuring devices and meters.

Unit 309 Reading and interpreting tables of figures, dials and scales

Guidance

Mathematical content	Sample context
To meet the assessment criteria for this learning outcome learners need to know how to:	Learners might:
1.1 extract information from tables of figures.	• extract information from timetables, payslips, bank statements, metric/imperial conversions, town/distance tables, bus and train fare tables and ready reckoners eg: I leave Sparkbrook at 0710. What time is the bus due to arrive at Acocks Green?

Birmingham to Acocks Green						
Monday - Friday						
Provider	NXB	NXB	NXB	NXB	NXB	NXB
Route no	3	**3A**	3	**3A**	3	**3**
Priory Quay Bus Mall	0529	**0609**	-	**0634**	-	**0710**
Corporation Street	0531	**0611**	-	**0656**	-	**0712**
Bordesley Middleway	0536	**0620**	-	**0706**	-	**0717**
Sparkbrook	0544	**0624**	-	**0710**	-	**0726**
Wake Green	0550	**0630**	-	**0717**	-	**0733**
Cleeve Road	0556	**0638**	0626	**0726**	0711	**0741**
Yardley	0600	**0640**	0630	**0729**	0715	**0745**
Shirley Rail Station	-	**0644**	0634	**0733**	0719	**0749**
Sandy Hill	-	**-**	0638	**-**	0724	**0754**
Robin Hood Island	-	**-**	0640	**-**	0726	**0756**
Solihull Railway Station	-	**-**	0652	**-**	0739	**0809**
Robin Hood Island	-	**0650**	-	**0740**	-	**-**
Gospel Oak	-	**0654**	-	**0745**	-	**-**
Acocks Green	-	**0703**	-	**0754**	-	**-**

Unit 309 Reading and interpreting tables of figures, dials and scales

Guidance

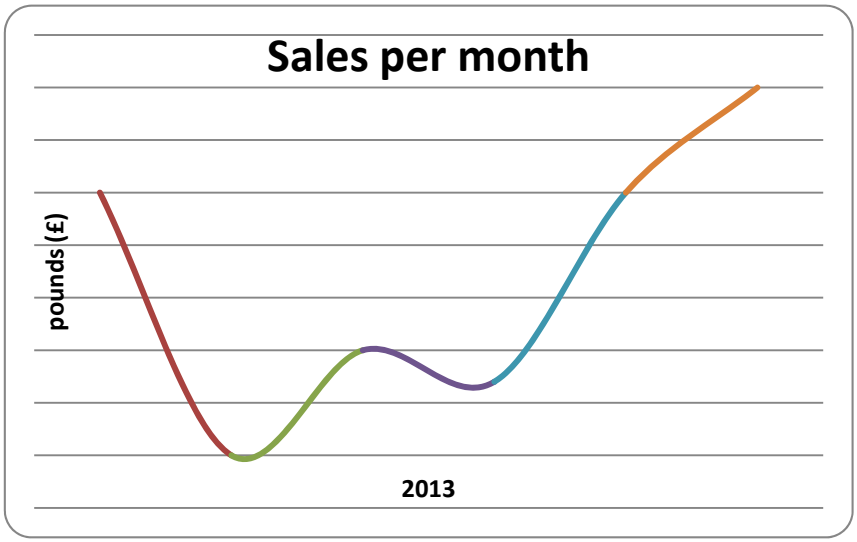
Mathematical content	Sample context
1.2 read dials and scales on measuring devices and meters.	• read this scale to the nearest 0.1kg

Unit 310 Elementary statistics

Level:	Stage 3
Relationship to other standards:	This unit links to the National Standards for Mathematics where applicable.
Aim:	The aim of this unit is to develop skills in extracting and interpreting information presented in graphical form. The learner will also apply and use averages and probability.

Learning outcome
The learner will: 1. Extract and interpret information presented in graphical form and apply and use averages and probability.
Assessment criteria
The learner can: 1.1 extract and interpret in a critical manner information presented in graphical form 1.2 apply average as a 'typical' value and use the appropriate average ie mean, median or mode in solving problems 1.3 find and interpret the range in solving problems 1.4 apply simple ideas of probability to the occurrences of everyday life.

Mathematical content	Sample context
To meet the assessment criteria for this learning outcome learners need to know how to:	Learners might:
1.1 extract and interpret in a critical manner information presented in graphical form.	• Extract information from line graphs eg: The graph shows the sales per month for a Department Store. Determine the increase in sales for March compared to February. • Use a graph to identify trends and make predictions eg Use the graph to predict the sales for July



Mathematical content	Sample context
	• critically examine the effect of the suppression of the zero on graphs eg: What is misleading about this graph?
	
1.2 apply average as a 'typical' value and use the appropriate average ie mean, median or mode in solving problems	• Find the mean, mode or median in a range of contexts eg: o Average earnings o Survey results • Decide which average to use as a typical value in different situations eg: o Salaries o Average prices • Use calculations to show how extreme values affect the mean of sets of data eg: o House rents
1.3 find and interpret the range in solving problems	• Work out the range of temperatures and explain what the range informs about the variation of temperatures
1.4 apply simple ideas of probability to the occurrences of everyday life.	• Apply probability in everyday life including simple games of chance, selection, genetics eg: o In a game using a cube dice a player requires a three or four to progress. What is the probability that the first throw will be a three or four? o In a certain type of plant the flowers are either red or white. The probability that they are red is 1/3. What is the probability that they are white?

Unit 311 Elementary algebra

Level:	Stage 3
Relationship to other standards:	This unit links to the National Standards for Mathematics where applicable.
Aim:	The aim of this unit is to develop skills in working with formulae and equations.

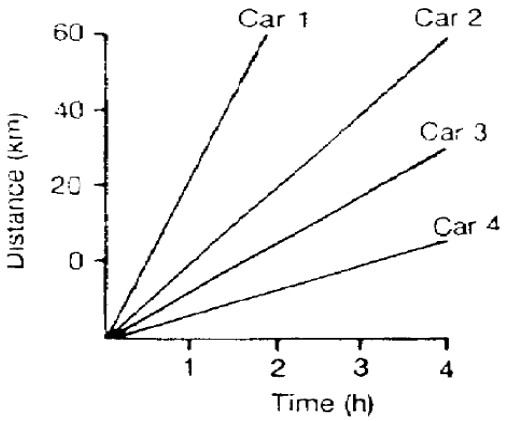
Learning outcome
The learner will: 1. Work with formulae and equations.
Assessment criteria
The learner can: 1.1 substitute positive values into given formulae including simple squares, cubes and square roots 1.2 solve simple linear equations 1.3 construct simple formulae and equations 1.4 draw graphs from experimental or given data 1.5 use information presented in graphical form including the basic idea of gradient as a rate of change.

Unit 311 Elementary algebra

Guidance

Mathematical content	Sample context
To meet the assessment criteria for this learning outcome learners need to know how to:	Learners might:
1.1 substitute positive values into given formulae including simple squares, cubes and square roots.	• use (°F – 32) x $\frac{5}{9}$ = °C to find the temperature expressed in °C when the temperature is 92°F. • evaluate $a = bc + d$ work out the volume of a cone using the formula V = $\frac{1}{3}\pi$ r^{2}h • use the formula $s = \frac{d}{t}$ to find the speed a car needs to travel to cover 110 kilometres in 2 hours. • Use the formula for final velocity, $v=u+at$ to find the time (t secs) when the initial velocity (u m/s) is 3m/s, the final velocity (v m/s) is 7m/s and the acceleration (a m/s^2) is 2m/s^2
1.2 solve simple linear equations.	• solve $3x - 5 = 16$ • solve $2 - y = 5$ • solve $2x + 1 = 8$
1.3 construct simple formulae and equations.	• construct simple formulae and equations including mensuration, gross pay, profits, speed, operating costs eg: a person's take home pay ($P) is worked out by deducting tax and national insurance ($D) from the gross pay ($G). Write an equation for calculating take home pay.
1.4 draw graphs from experimental or given data.	• draw a distance time graph of a car travelling at a steady speed of 30kph

Mathematical content	Sample context
1.5 use information presented in graphical form including the basic idea of gradient as a rate of change.	• use the graph to identify which car is travelling at the greatest speed.

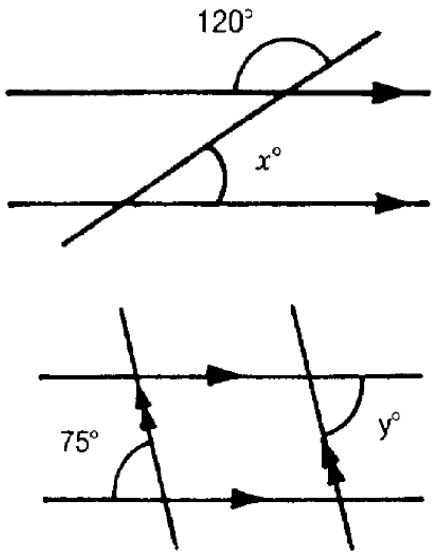


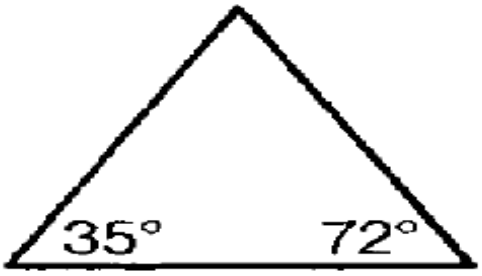
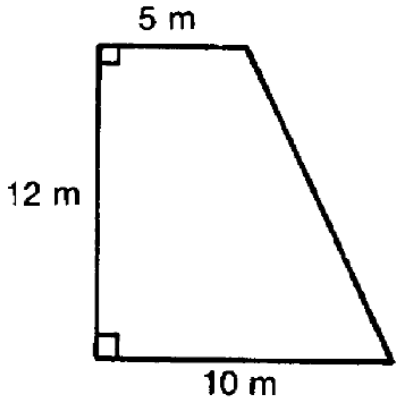
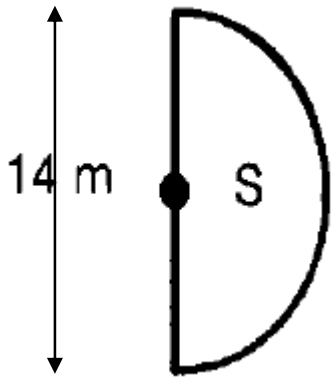
Unit 312 Shape and space

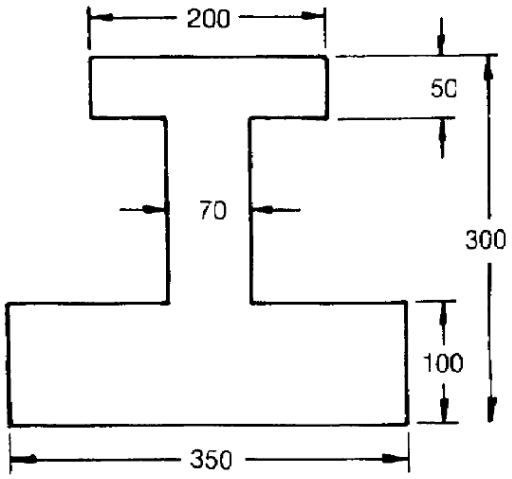
Level:	Stage 3
Relationship to other standards:	This unit links to the National Standards for Mathematics where applicable.
Aim:	The aim of this unit is to develop skills in working with shape and space including composite shapes.

Learning outcome
The learner will: 1. Develop skills in working with shape and space.
Assessment criteria
The learner can: 1.1 recognise the quadrilaterals: parallelogram, rhombus, trapezium; the polygons: pentagon, hexagon and octagon 1.2 recognise and use alternate and corresponding angles 1.3 use three-figure bearings 1.4 know and use sum of angles of triangles and quadrilaterals 1.5 know and use Pythagoras' theorem 1.6 calculate, without being given the formulae, the perimeter and area of rectilinear figures, triangles and composite figures 1.7 Understand the ratio and calculate, without being given the formulae, the circumference and area of circular figures 1.8 calculate the volume of 3 dimensional objects with constant cross-section 1.9 use the basic ideas of similarity in comparing areas and volumes respectively in simple examples.

Unit 312 Shape and space
Guidance

Mathematical content	Sample context
To meet the assessment criteria for this learning outcome learners need to know how to:	Learners might:
1.1 recognise the quadrilaterals: • parallelogram • rhombus • trapezium and polygons: pentagon, hexagon and octagon.	• find shapes in the classroom and everyday life
1.2 recognise and use alternate and corresponding angles.	• calculate the valued of x and y 
1.3 use three-figure bearings.	• use three-figure bearings to express the bearing an aircraft is flying along when flying southwest
1.4 know and use sum of angles of triangles and quadrilateral.	• calculate the remaining angle in a four-sided polygon, where three of the angles measure 76°, 105° and 58° • work out how many sides a regular polygon if each angle measures 60°

Mathematical content	Sample context
1.5 know and use Pythagoras' Theorem.	• calculate the remaining internal angle of the triangle 
1.6 calculate, without being given the formula, the perimeter and area of rectilinear figures, triangles and composite figures.	• calculate the perimeter of the shape;  • calculate the area of paving required for a path 12 m wide paved around a lawn measuring 3 m by 5 m
1.7 understand the ratio π and calculate, without being given the formulae, the circumference and area of circular figures.	• find the circumference and area of circular objects practically, introducing the ratio π eg What is the area of this semi-circular flowerbed? Take the value of π as $\frac{22}{7}$. 

Mathematical content	Sample context
1.8 calculate the volume of 3 dimensional objects with constant cross-section.	• calculate the volume of a beam 2 m long which has the cross-sectional dimensions (in mm) as shown below; 
1.9 use the basic ideas of similarity.	• compare the properties of shapes including angles, side lengths, areas and volumes in contexts such as model building. For example doubling all the side lengths of a triangle and noting this does not change the internal angles • calculate how many times the length of side of box B is the length of side box A is where the volume of box A is 27 times the volume of box B. • work out that doubling linear dimensions gives 4 x surface area and 8 x volume • eg If a cube has sides of 2 cm, doubling the length increases the surface area f the base of the cube from 4 cm^2 to 16 cm^2 and the volume from 8 cm^3 to 64 cm^3

Glossary

Use of the calculator is encouraged throughout the course but NOT in the written paper (multiple-choice).

Students at Stage 1 will be expected to appreciate the importance of the order of operations when using a calculator. This will include the use of brackets at all later stages.

All currency must be quoted to a whole number or 2 decimal places.

Measurement and standard units

Mass and weight

In everyday life the term 'weight' is often used incorrectly when it should be 'mass'.
Mass is the quantity of matter in a body and is measured in the standard units of kg and g.
Weight is the force which the earth exerts on the mass of a body and is measured in N (newtons).
(A mass of 1 kg has the weight of approximately 10 N).
In this syllabus, the term mass has been used throughout, where appropriate. However, the verb 'to weigh' is retained because it is a practical activity.

Metric measures

Length

10 millimetres	is	1 centimetre (cm)
1000 millimetres	is	1 metre (m)
100 centimetres	is	1 metre
1000 metres	is	1 kilometre (km)

Mass

1000 grams (g)	is	1 kilogram (kg)
Tonne	is	1000 kg

Capacity/Volume

millilitre (ml)	is	cubic centimetre (cm^3)
1000 ml	is	1 litre (l)
10 ml	=	centilitre (cl)
1000 ml = 100ct	=	1 litre (l)

Speed

metres per second	is	m/s m/s-1
miles per hour	is	miles per hour
miles per second	is	miles per second
kilometres per hour	is	km/h
acceleration metres/ sec/sec	is	m/s2 m/s-2

Time

60 seconds (s)	is	1 minute (min)
60 minutes	is	1 hour(h)
24 hours	is	1 day (d)
7 days	is	1 week(wk)
1 month (monthly groupings)	is	31/30/28/29 days
365 days	is	1 year
366 days	is	1 leap year
13 weeks	is	1 quarter
52 weeks	is	1 year
12 months	is	1 year p.a. or per annum is per year

Time of day expressed in terms of 12 hour and 24 hour clock -
am
pm
noon - 12.00 am 1200
midnight - 12.00 pm - 0000 – 2400 (Note: Special use of the word 'hundred')
days of the week
months of the year

Temperature
degrees Celsius (°C)
degrees Fahrenheit (°F)

Approximate imperial/metric conversion
2 pounds is slightly less than 1 kilogram
1 inch is slightly more than 2 ½ centimetres
1 foot is approximately equal to 30 centimetres
1 yard is slightly less than 1 metre
5/8 mile is approximately equal to 1 kilometre
2 pints is slightly more than 1 litre

Shape and space
area - units
square millimetre (mm^2)
square centimetre (cm^2)
square metre (m^2)

Volume – units
cubic millimetre (mm^3)
cubic centimetre (cm^3)
cubic metre (m^3)

Formulae

Area of triangle = $\frac{1}{2}$ X base X height (or A = $\frac{1}{2}$ bh)
Circumference of a circle = d (or 2 r).
Area of circle = r2

Volume of pyramid = $\frac{1}{3}$ X area of base X height
Volume of sphere = $\frac{4}{3}$ r3
Volume of cylinder = r2h
Volume of cone = $\frac{1}{3}$ r2h

Curved surface area of cone = πr /
Surface area of sphere = $4\pi r^2$
Curved surface area of cylinder = 2 πrh

Tringonometry

right angled triangle: sine of angle (sin) = $\frac{opposite}{hypotenuse}$

cosine of angle (cos) = $\frac{adjacent}{hypotenuse}$

tangent of angles (tan) = $\frac{opposite}{adjacent}$

Extended work: angles in degrees°

Operations on whole numbers

≥greater than or equal to
≤less than or equal to
± plus or minus
≠- not equal
one thousand (1000 or 10^3 or 1K)
one million (1 000 000 or 10^6 or 1M)
one billion (1 000 000 000 000 or 10^{12})

Elementary statistics

52 cards in a pack; the four suits, jack, queen, king, ace, etc.
die/dice - in any question the number of faces on a die will be specified.
The numbers on the faces will be 1,2, ... *n* where *n* is the number of faces

Examination question paper specifications

Paper 3750-001

The examination question paper contains 60 questions to be answered in 2 hours. The syllabus topics are covered by questions in approximately the percentages shown below.

Learners will **NOT** be allowed to use a calculator in this examination.

Topic	Percentage of questions: approx
101 Number	20
102 Measurement and standard units	15
103 Pictograms, tables, charts and graphs	10
104 Shape and space	17
105 Operations on whole numbers less than ten thousand	15
106 Operations on decimal fractions involving tenths and hundredths	13
107 Operations on common fractions involving halves and quarters	5
108 Appropriate strategies and use of the calculator	5

Paper 3750-002

The examination question paper contains 60 questions to be answered in 2 hours. The syllabus topics are covered by questions in approximately the percentages shown below.

Learners will **NOT** be allowed to use a calculator in this examination.

Topic	Percentage of questions: approx
201 Place value	5
202 Measurement and standard units	10
203 Operations on whole numbers	13
204 Operations on decimal fractions	10
205 Operations on common fractions	8
206 Percentages	7
207 Conversions between common fractions, decimal fractions and percentages	5
208 Orders of magnitude	7
209 Ratio and proportions	5
210 Average	5
211 Elementary algebra	5
212 Shape and space	10
213 Construct, interpret and use tables of figures, graphs charts, and maps	10

Paper 3750-003

The examination question paper contains 60 questions to be answered in 2 hours. The syllabus topics are covered by questions in approximately the percentages shown below.

Learners will **NOT** be allowed to use a calculator in this examination.

Topic	Percentage of questions: approx
301 Operations on integers	13
302 Operations on decimal fractions	12
303 Operations on common fractions	12
304 Order of operations and use of the calculator	3
305 Percentages	7
306 Conversions between decimal fractions, common fractions and percentages	5
307 Ratio and proportion	5
308 Measurement and standard units	5
309 Reading and interpreting tables of figures, dials and scales	5
310 Elementary statistics	10
311 Elementary algebra	10
312 Shape and space	13

Useful contacts

International learners	
General qualification information	E: **intcg@cityandguilds.com**
Centres	
Exam entries, Certificates, Registrations/enrolment, Invoices, Missing or late exam materials, Nominal roll reports, Results	E: **centresupport@cityandguilds.com**
Single subject qualifications	
Exam entries, Results, Certification, Missing or late exam materials, Incorrect exam papers, Forms request (BB, results entry), Exam date and time change	E: **singlesubjects@cityandguilds.com**
International awards	
Results, Entries, Enrolments, Invoices, Missing or late exam materials, Nominal roll reports	E: **intops@cityandguilds.com**
Walled Garden	
Re-issue of password or username, Technical problems, Entries, Results, e-assessment, Navigation, User/menu option, Problems	E: **walledgarden@cityandguilds.com**
Employer	
Employer solutions, Mapping, Accreditation, Development Skills, Consultancy	E: **business@cityandguilds.com**

If you have a complaint, or any suggestions for improvement about any of the services that we provide, email: **feedbackandcomplaints@cityandguilds.com**

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