

The

EDEXCEL AWARDS

Edexcel Level 1 Award in Number and
Measure (ANM10)

Edexcel Level 2 Award in Number and
Measure (ANM20)

For first teaching from September
2011

Issue 2 (September 2016)

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Introduction

This scheme of work has been designed for teachers delivering the Edexcel Award in Number and Measure. This scheme of work is based upon a course model which can be taught over a single year, or more years if desired, for both Level 1 and Level 2 tier students.

The scheme of work is structured so each module contains:

- Module number
- Recommended teaching time, though of course this is adaptable according to individual student needs
- Level
- Contents, referenced back to the specification
- GCSE specification references
- Prior knowledge and links with the alternative level (applicable to Level 2 only)
- Links to the GCSE scheme of work modules
- Objectives for students at the end of the module
- Ideas for differentiation and extension activities
- Notes for general mathematical teaching points and common misconceptions

Updated versions of this scheme of work will be available via a link from the Edexcel Mathematics Awards website (www.edexcel.com/mathsawards).

This course can be taught as a stand-alone course.

Alternatively it can be taught as an introduction to GCSE Mathematics, with differentiation extending the content from an Awards course into GCSE topics where possible. The links to the GCSE schemes of work are given for this reason.

This course can be supported by a range of resources. At the end of the document we have provided a table which can be populated with the resources and links of choice to support delivery.

Issue 2 (September 2016)

Issue 2 has been updated by replacing the GCSE Mathematics 1MA0 and 2MB01 specification and scheme of work references with those for the new GCSE (9–1) Mathematics 1MA1, for first teaching September 2015.

The Edexcel Award in Number and Measure

Level 1 (ANM10)

Scheme of work

Level 1 course overview

The table below shows an overview of modules in the Level 1 scheme of work.

Teachers should be aware that the estimated teaching hours are **approximate** and should be used as a guideline only.

Module number	Title	Estimated teaching hours
1	Number size and rounding	4.5
2	Integers and the 4-rules	6
3	Decimals	5
4	Reading scales	4
5	Converting units	5
6	Tables and charts	4
7	Types of number	4
8	Fractions	6
9	Fractions, decimals and percentages	4
10	Percentages and applications	7
11	Perimeter and area	6
12	Time and timetables	6
13	Volume	4
	Total	65.5

Awards Tier: Level 1

Contents: Number size and rounding

- 1.1 Read, write, order and compare positive integers up to 1000
- 1.3 Multiply and divide positive integers by 10, 100 and 1000
- 1.5 Know multiplication and division facts up to 10×10
- 1.6 Round positive integers to the nearest 10, 100 and 1000
- 6.1 Read, write, order and compare money

GCSE SPECIFICATION REFERENCES

- N1 Order positive ... integers ...; use the symbols =, ≠, <, >, ≤, ≥
- N2 Understand and use place value
- N13 Use standard units of ... money ...
- N15 Round numbers ... to an appropriate degree of accuracy ...
- G14 Use standard units of measure ... (... money ...)

PRIOR KNOWLEDGE

The ability to order simple numbers

An appreciation of place value

Knowledge of integer complements to 10 and to 100

An appreciation of monetary units and/or unitary values for pounds and pence

OBJECTIVES

By the end of the module the student should be able to:

- Use and order positive integers
- Write numbers in words and write numbers from words
- Recall all multiplication facts up to 10×10 , and use them to derive quickly the corresponding division facts
- Multiply or divide any number by powers of 10
- Round whole numbers to the nearest 10, 100 and 1000

LINKS TO LEVEL 2 (extension work)

- 1.9 Read, write, order and compare positive and negative integers of any size

LINKS TO GCSE SCHEME OF WORK (2-year)

Foundation Unit 1a

DIFFERENTIATION & EXTENSION

Try investigations with digits 3, 7, 5 and 2 and challenge students to find the biggest number, smallest odd number, the largest sum or product etc

Round amounts of money to the nearest pound; use different denominations of notes and/or coins to make up given amounts of money

Work out change for a variety of bills

NOTES

Present all working clearly

Start by ordering small numbers, then work up to higher numbers

If necessary work with objects that can assist with counting, eg compare the number of objects in several boxes and order the boxes by number of contents

Awards Tier: Level 1

Contents: Integers and the 4-rules

- 1.2 Add and subtract positive integers
- 1.4 Multiply and divide by positive integers (single digit multiplier and divisor for non-calculator section)
- 1.8 Understand negative numbers and use a number line to order, add and subtract negative numbers
- 2.5 Round decimals to one decimal place and the nearest integer, and round money in calculations to the nearest penny
- 3.1 Check solutions to questions and problems by considering whether the answer is sensible
- 6.2 Add, subtract, multiply and divide quantities of money (integers)

GCSE SPECIFICATION REFERENCES

- N1 Order ... negative integers, decimals and fractions; use the symbols =, ≠, <, >, ≤, ≥
- N2 Apply the four operations, including formal written methods, to integers ... – both positive and negative ...
- N13 Use standard units of ... money using decimal quantities where appropriate
- N14 Estimate answers; check calculations using approximation and estimation, including answers obtained using technology
- N15 Round numbers and measures to an appropriate degree of accuracy (eg to a specified number of decimal places or significant figures)
- G14 Use standard units of measure ... (... money ...)

PRIOR KNOWLEDGE

The ability to order numbers

An appreciation of place value

Experience of the four operations using whole numbers

Knowledge of integer complements to 10 and to 100

Knowledge of strategies for multiplying and dividing whole numbers by 2, 4, 5 and 10

OBJECTIVES

By the end of the module the student should be able to:

- Use and order positive and negative numbers
- Add and subtract integers, including negative numbers
- Multiply or divide any number by powers of 10
- Multiply and divide positive numbers, add and subtract negative numbers
- Round numbers to one decimal place and to the nearest integer
- Carry out calculations using money, having an appreciation for money notation
- Check calculations by rounding or considering whether the answer is sensible, eg $29 \times 31 \approx 30 \times 30$

LINKS TO LEVEL 2 (extension work)

- 1.9 Read, write, order and compare positive and negative integers of any size
- 1.10 Add, subtract, multiply and divide integers of any size
- 1.11 Multiply and divide using negative integers
- 3.2 Check solutions to questions and problems by using suitable approximations

LINKS TO GCSE SCHEME OF WORK (2-year)

Foundation Unit 1a, 1b

DIFFERENTIATION & EXTENSION

Estimate answers to calculations involving the four rules of operation

Directed number work with multi-step calculations

Encourage effective use of a calculator

Practice number skills with real-life problems, eg shopping

Work out change for a variety of bills

Magic squares

NOTES

Present all working clearly

For non-calculator methods, ensure that remainders are shown as evidence of working

Show what is entered into your calculator, not just the answer

Try different methods from traditional ones, eg Russian or Chinese methods for multiplication

Start with small numbers (< 6) to secure understanding of necessary operations, move to larger numbers once confidence has been established

Sudoku puzzles are useful for looking at number bonds and links with numbers

Awards Tier: Level 1

Contents: Decimals

- 2.1 Read, write, order and compare decimals up to two decimal places, and understand place value
- 2.2 Add and subtract decimals up to two decimal places
- 2.3 Multiply decimals with up to two decimal places (single digit whole number multiplier for non-calculator section)
- 2.4 Divide decimals with up to two decimal places, using a calculator
- 2.5 Round decimals to one decimal place and the nearest integer

GCSE SPECIFICATION REFERENCES

- N1 Order ... decimals ...; use the symbols =, ≠, <, >, ≤, ≥
- N2 Apply the four operations, including formal written methods, to ... decimals ... – ... both positive and negative; understand and use place value (eg when working with very large or very small numbers, and when calculating with decimals)
- N15 Round numbers and measures to an appropriate degree of accuracy (eg to a specified number of decimal places or significant figures)

PRIOR KNOWLEDGE

The concept of a decimal

The four operations

OBJECTIVES

By the end of the module the student should be able to:

- Understand place value, identifying the values of the digits
- Write decimals in order of size
- Round decimals to the nearest integer or to one decimal place
- Add and subtract decimals
- Multiply and divide decimal numbers by integers and decimal numbers

LINKS TO LEVEL 2 (extension work)

- 2.5 Multiply decimals with up to two decimal places (two digit multiplier and divisor for non-calculator section)
- 2.6 Round decimals to two decimal places
- 2.7 Add and subtract any decimal

LINKS TO GCSE SCHEME OF WORK (2-year)

Foundation Unit 1b

DIFFERENTIATION & EXTENSION

Practice long multiplication and division without using a calculator

Use decimals in real-life problems as much as possible, eg money problems

Money calculations that require rounding answers to the nearest penny

Multiply and divide decimals by decimals with up to two decimal places

Round answers to appropriate degrees of accuracy to suit the context of the question

NOTES

Advise students not to round decimals used in calculations until stating them in the final answer

For non-calculator methods ensure that remainders are shown as evidence of working

Advise students to show decimal points clearly, and to keep them in line when adding and subtracting

Awards Tier: Level 1

Contents: Reading scales

- 8.1 Know and use units of measure for length, weight, angles, capacity, temperature, including metric and imperial units eg imperial units include miles, inches, feet, pounds, gallons and pints
- 8.4 Read integer scales
- 8.5 Draw and measure lines and angles, accurate to the nearest cm and degree

GCSE SPECIFICATION REFERENCES

- N13 Use standard units of mass, length, time, money and other measures ... u
- G14 Use standard units of measure and related concepts (length, area, volume/capacity, mass, time, money, etc.)
- G15 Measure line segments and angles in geometric figures ...

PRIOR KNOWLEDGE

An awareness of the imperial system of measures

An awareness of place value in decimal numbers (to 1 d.p.)

A right angle is 90° ; greater than a right angle is more than 90° (for using protractor scales)

OBJECTIVES

By the end of the module the student should be able to:

- Interpret scales on a range of metric measuring instruments including: mm, cm, m, km, ml, cl, l, mg, g, kg, tonnes, $^\circ\text{C}$
- Interpret scales on a range of imperial measuring instruments including: inches, feet, ounces, pounds, fluid ounces, mph
- Indicate given values on a scale

LINKS TO LEVEL 2 (extension work)

- 9.6 Read decimal scales

LINKS TO GCSE SCHEME OF WORK (2-year)

Foundation Unit 6a, 8 (prior knowledge)

DIFFERENTIATION & EXTENSION

This could be made a practical activity by collecting assorted everyday items and then weighing and measuring them to check the estimates of their lengths, weights and volumes

Use the internet to find the weights, volumes and heights of large structures such as buildings, aeroplanes and ships

Take the opportunity to do some real measuring/estimating around school

NOTES

Measurement is essentially a practical activity

Use a range of everyday objects to bring reality to lessons

Provide opportunities for students to select the unit of measure to use

Awards Tier: Level 1

Contents: Converting units

- 8.1 Know and use units of measure for length, weight, angles, capacity, temperature, including metric and imperial units eg imperial units include miles, inches, feet, pounds, gallons and pints
- 8.2 Add and subtract units of measure
- 8.3 Convert units of measure in the metric system

GCSE SPECIFICATION REFERENCES

- N2 Apply the four operations, including formal written methods, to integers, decimals and simple fractions (proper and improper), and mixed numbers – all both positive and negative; understand and use place value (eg when working with very large or very small numbers, and when calculating with decimals)
- N13 Use standard units of mass, length, time, money and other measures ... using decimal quantities where appropriate
- R1 Change freely between related standard units (eg time, length, area, volume/capacity, mass) ... in numerical ... contexts
- G14 Use standard units of measure and related concepts (length, area, volume/capacity, mass, time, money, etc.)

PRIOR KNOWLEDGE

An awareness of the imperial system of measures

Strategies for multiplying and dividing by 10 (for converting metric units)

OBJECTIVES

By the end of the module the student should be able to:

- Know that measurements using real numbers depend upon the choice of unit
- Convert metric units to metric units (metric equivalents should be known)
- Write a set of measurements in order
- Estimate conversions

LINKS TO LEVEL 2 (extension work)

9.7 Convert between metric and imperial units

- eg 5 miles = 8 km
- 12 inches = 1 foot = 30 cm
- 2.2 pounds = 1 kg
- 8 pints = 1 gallon = 4.5 litres

LINKS TO GCSE SCHEME OF WORK (2-year)

Foundation Unit 8

DIFFERENTIATION & EXTENSION

Use conversions for height and weight of students, cars, bridges etc

Combine with simple scales such as 1 cm to 1 m for classrooms, playing fields, bedrooms

Ask them to draw a plan of their ideal design for their bedroom, including the furniture

NOTES

Use a range of everyday objects to bring reality to lessons

Use estimation to give a 'reality check' to answers

Awards Tier: Level 1

Contents: Tables and charts

- 11.1 Read, construct and use everyday tables and charts, eg mileage charts, bar charts, line graphs, currency conversion tables and timetables (bus, train and airlines)

GCSE SPECIFICATION REFERENCES

- R10 Solve problems involving direct and inverse proportion, including graphical ... representations
- S2 Interpret and construct tables, charts and diagrams, including frequency tables, bar charts, pie charts and pictograms for categorical data, vertical line charts for ungrouped discrete numerical data, tables and line graphs for time series data and know their appropriate use

PRIOR KNOWLEDGE

An understanding of why data needs to be collected and some idea about different types of charts

OBJECTIVES

By the end of the module the student should be able to:

- Draw:
 - Bar charts
 - Mileage charts
 - Line graphs
- Interpret:
 - Bar charts
 - Mileage charts
 - Line graphs
 - Conversion tables and charts

LINKS TO LEVEL 2 (extension work)

- 12.2 Draw and interpret pie charts and frequency tables

LINKS TO GCSE SCHEME OF WORK (2-year)

Foundation Unit 3a

DIFFERENTIATION & EXTENSION

Collect examples of charts and graphs in the media which have been misused and discuss the implications

Draw a set of conversion charts for current foreign currency

Produce graphs and charts from data collected by students (either primary or secondary data)

Use of calendars for planning exercises, eg holiday planning, scheduling

NOTES

Reiterate that clear presentation with axes correctly labelled is important, and to use a ruler to draw straight lines

Encourage group work and presenting their charts (useful display material for classrooms or corridors)

Use Excel Graph wizard

Awards Tier: Level 1

Contents: Types of number

- 1.7 Understand and use multiples, factors, common factors and understand prime numbers

GCSE SPECIFICATION REFERENCES

- N4 Use the concepts and vocabulary of prime numbers, factors (divisors), multiples, common factors, common multiples ...

PRIOR KNOWLEDGE

Number complements to 10 and multiplication/division facts

Recognise basic number patterns

Experience of classifying integers

OBJECTIVES

By the end of the module the student should be able to:

- Recognise even and odd numbers
- Identify factors, multiples and prime numbers
- Find the common factors of two numbers

LINKS TO LEVEL 2 (extension work)

- 1.12 Find the Highest Common Factor and Lowest Common Multiple of any two positive integers
- 1.13 Read, write and use squares, cubes and square roots
- 1.14 Read, write and use index notation for small positive integer powers

LINKS TO GCSE SCHEME OF WORK (2-year)

Foundation Unit 1d

DIFFERENTIATION & EXTENSION

Calculator exercise to check factors of larger numbers

NOTES

All of the work in this module can be easily reinforced by using it as 'starters' or 'plenaries'

Calculators should be used only when appropriate

Use of dot patterns to identify types of numbers, eg odd, even, multiples, square numbers

Awards Tier: Level 1

Contents: Fractions

- 4.1 Read, write, order and compare fractions and mixed numbers
- 4.2 Use equivalent fractions
- 4.3 Write fractions in their simplest form
- 4.5 Add and subtract simple fractions (with the same denominator, excluding mixed fractions)
- 4.6 Multiply a fraction by a positive integer, and find a fraction of a whole number quantity (positive integers only)

GCSE SPECIFICATION REFERENCES

- N1 Order ... fractions; use the symbols =, ≠, <, >, ≤, ≥
- N2 Apply the four operations ... to ... simple fractions (proper ...) ...
- N8 Calculate exactly with fractions ...

PRIOR KNOWLEDGE

Multiplication facts

Ability to find common factors

A basic understanding of fractions as being 'parts of a whole unit'

OBJECTIVES

By the end of the module the student should be able to:

- Visualise a fraction diagrammatically
- Understand a fraction as part of a whole
- Recognise and write fractions in everyday situations
- Write a fraction in its simplest form and find equivalent fractions
- Compare the sizes of fractions using a common denominator
- Add and subtract simple fractions by using a common denominator
- Write an improper fraction as a mixed number
- Multiply a fraction by a positive integer

LINKS TO LEVEL 2 (extension work)

- 4.7 Multiply fractions, including mixed numbers
- 4.8 Divide fractions, including mixed numbers, using a calculator
- 4.9 Add and subtract fractions with different denominators and mixed numbers
- 4.10 Use fractions to compare quantities

LINKS TO GCSE SCHEME OF WORK (2-year)

Foundation Unit 4a

DIFFERENTIATION & EXTENSION

Careful differentiation is essential as this topic is dependent on the student's ability

Solve real-life problems and word problems involving fractions, eg finding a perimeter from a shape with fractional side lengths

Divide objects up into fractions, eg circles, pizza, cakes

Use of a fraction board to compare fractions

Fraction dominoes

NOTES

Regular revision of fractions is essential

Demonstrate how to use the fraction button on a calculator in order be able to check solutions

Awards Tier: Level 1**Contents: Fractions, decimals and percentages**

- 4.4 Convert simple fractions to decimals (up to 2 decimal places) and vice versa
eg $\frac{1}{2}, \frac{1}{4}, \frac{1}{5}, \frac{1}{10}$ and multiples of these fractions
- 5.1 Read, write, order and compare simple percentages, eg 10%, 25%, 20%, 50% and 75%
- 5.2 Use equivalencies between decimals, fractions and percentages
eg $25\% = \frac{1}{4} = 0.25$

GCSE SPECIFICATION REFERENCES

- N10 Work interchangeably with terminating decimals and their corresponding fractions (such as 3.5 and $\frac{7}{2}$ or 0.375 and $\frac{3}{8}$) ...
- R9 Define percentage as 'number of parts per hundred'; interpret percentages and percentage changes as a fraction or a decimal ...

PRIOR KNOWLEDGE

Four operations of number

The concepts of a fraction and a decimal

Number complements to 10 and multiplication tables

Awareness that percentages are used in everyday life

OBJECTIVES

By the end of the module the student should be able to:

- Understand that a percentage is a fraction in hundredths
- Convert between fractions and decimals
- Convert between fractions, decimals and percentages

LINKS TO LEVEL 2 (extension work)

7.4 Convert between currencies

LINKS TO GCSE SCHEME OF WORK (2-year)

Foundation Unit 4a

DIFFERENTIATION & EXTENSION

Consider fractions and percentages of amounts, eg $12.5\% = 0.125 = \frac{1}{8}$

Consider situations which lead to percentages of more than 100%

Use fraction, decimal and percentage dominos or follow me cards

Practice the ability to convert between different forms

Use of a fraction board to compare fractions and decimals

NOTES

Keep using non-calculator methods, eg start with 10%, then 1% in order to reach the required percentage

Awards Tier: Level 1

Contents: Percentages and applications

- 5.3 Work out simple percentages of quantities, including VAT
- 6.2 Add, subtract, multiply and divide quantities of money, household finance, utility bills, shopping bills, interest (for 1 year)

GCSE SPECIFICATION REFERENCES

- N2 Apply the four operations, including formal written methods, to integers, decimals ...
- N13 Use standard units of ... money using decimal quantities where appropriate
- R9 Define percentage as 'number of parts per hundred'; interpret percentages and percentage changes as a fraction or a decimal, and interpret these multiplicatively; ... solve problems involving percentage change, including percentage increase/decrease ... and simple interest including in financial mathematics
- G14 Use standard units of measure ... (... money ...)

PRIOR KNOWLEDGE

Four operations of number
The concepts of a fraction and a decimal
Number complements to 10 and multiplication tables
Awareness that percentages are used in everyday life

OBJECTIVES

By the end of the module the student should be able to:

- Use percentages to solve problems
- Find a percentage of a quantity
- Use percentages in real-life situations
 - VAT
 - Value of profit or loss
 - Income tax calculations
 - NI calculations

LINKS TO LEVEL 2 (extension work)

- 5.4 Find percentages of quantities of any value
 - 5.5 Calculate percentage increase and decrease
 - 7.5 Calculate simple interest
 - 7.6 Calculate wages and salaries, including national insurance and tax deductions
-

LINKS TO GCSE SCHEME OF WORK (2-year)

Foundation Unit 4b

DIFFERENTIATION & EXTENSION

Use a mixture of calculator and non-calculator methods

Use ideas for wall display, students make up their own poster to explain say a holiday reduction

Use Functional Elements questions to look at questions in context

Problems which lead to the necessity of rounding to the nearest penny, eg real-life contexts

NOTES

Use plenty of practical examples that can be linked to real-life situations, eg VAT calculations

Awards Tier: Level 1

Contents: Perimeter and area

- 9.1 Work out the perimeter of rectangles and shapes made from rectangles
- 9.2 Work out the area of rectangles and shapes made from rectangles

GCSE SPECIFICATION REFERENCES

- G14 Use standard units of measure and related concepts (length, area ...)

PRIOR KNOWLEDGE

Properties of rectangles
Concept of perimeter and area
Units of measurement
Four operations of number
Ability to use a ruler for measurement and drawing

OBJECTIVES

By the end of the module the student should be able to:

- Measure shapes to find perimeters and areas
- Find the perimeter of rectangles
- Find the perimeter of compound shapes
- Find the area of a rectangle
- Recall and use the formulae for the area of a rectangle
- Calculate areas of compound shapes made from rectangles

LINKS TO LEVEL 2 (extension work)

- 10.3 Work out the area and perimeter of rectangles, triangles, circles and semi-circles
- 10.4 Work out areas of composite shapes made from rectangles, triangles, circles and/or semi-circles

LINKS TO GCSE SCHEME OF WORK (2-year)

Foundation Unit 8

DIFFERENTIATION & EXTENSION

Further problems involving combinations of shapes
Use combinations of shapes where not all the lengths needed are given (but can be deduced)
Use practical examples from functional papers on topics such as returfing a garden, carpeting a room, laying tiles on a floor
Perimeter questions could use skirting board, wallpaper, planting a border of a garden

NOTES

Start with exercises involving counting squares and lengths, but move soon into use for the common formulae

Discuss the correct use of language and units, particularly when method marks are for the correct unit of measure

Ensure that students can distinguish between perimeter and area

Practical examples help to clarify the concepts, eg floor tiles

Awards Tier: Level 1

Contents: Time and timetables

- 7.1 Read, measure and record time using digital and analogue clocks in 12-hour and 24-hour format
- 7.2 Use units of time including seconds, minutes, hours, days, weeks, months and years
- 7.3 Work out intervals of time and convert between units of time
- 7.4 Read, measure and record events on calendars
- 11.1 Read, construct and use everyday tables and charts, eg tables and timetables (bus, train and airlines).

GCSE SPECIFICATION REFERENCES

- N13 Use standard units of ... time ... using decimal quantities where appropriate
- G14 Use standard units of measure ... (... time ...)
- S2 Interpret and construct tables ...

PRIOR KNOWLEDGE

Knowledge of metric units, eg 1 m = 100 cm

Know that 1 hour = 60 mins, 1 min = 60 seconds

Know how to read information from tables and other forms of illustration

OBJECTIVES

By the end of the module the student should be able to:

- Read times and work out time intervals
- Read times from analogue and digital clocks, working out time intervals
- Convert between 12-hour and 24-hour clock times
- Read bus and train timetables and plan journeys

LINKS TO LEVEL 2 (extension work)

None

LINKS TO GCSE SCHEME OF WORK (2-year)

Foundation Unit 3a

DIFFERENTIATION & EXTENSION

Use timetables to plan journeys

Consider international time zones; planning for a long haul flight

NOTES

Use of units with answers is important

Ensure students are aware of the pitfalls when using a calculator by explaining the difference between expressions of time, eg comparing 2.30 and 2:30

Awards Tier: Level 1

Contents: Volume

10.1 Work out the volume of a cuboid

GCSE SPECIFICATION REFERENCES

G16 Know and apply formulae to calculate ... volume of cuboids ...

PRIOR KNOWLEDGE

Concept of volume

Concept of a cuboid as a prism

Experience of constructing cubes or cuboids from multi-link

OBJECTIVES

By the end of the module the student should be able to:

- Find volumes of shapes by counting cubes
- Recall and use formulae for the volume of cubes and cuboids
- Calculate the volumes of shapes made from cubes and cuboids

LINKS TO LEVEL 2 (extension work)

11.1 Volumes of prisms and cylinders

LINKS TO GCSE SCHEME OF WORK (2-year)

Foundation Unit 8

DIFFERENTIATION & EXTENSION

Look at practical examples such as fish tanks, filling containers, finding the number of small boxes that fit into a large box

Further problems involving a combination of shapes

NOTES

Discuss the correct use of language and units

Remind students that there is often a mark attached to writing down the correct unit

Use practical problems to enable the students to understand the difference between perimeter, area and volume

Level 1 concepts and skills

What students need to learn:

Topic	Concepts and skills
1. Integers	<ol style="list-style-type: none">1. Read, write, order and compare positive integers up to 10002. Add and subtract positive integers3. Multiply and divide positive integers by 10, 100 and 10004. Multiply and divide by positive integers (single digit multiplier and divisor for non-calculator section)5. Know multiplication and division facts up to 10×106. Round positive integers to the nearest 10, 100 and 10007. Understand and use multiples, factors, common factors and understand prime numbers8. Understand negative numbers and use a number line to order, add and subtract negative numbers
2. Decimals	<ol style="list-style-type: none">1. Read, write, order and compare decimals up to two decimal places, and understand place value2. Add and subtract decimals up to two decimal places3. Multiply decimals with up to two decimal places (single digit whole number multiplier for non-calculator section)4. Divide decimals with up to two decimal places, using a calculator5. Round decimals to one decimal place and the nearest integer, and round money in calculations to the nearest penny
3. Approximation	<ol style="list-style-type: none">1. Check solutions to questions and problems by considering whether the answer is sensible
4. Fractions	<ol style="list-style-type: none">1. Read, write, order and compare fractions and mixed numbers2. Use equivalent fractions3. Write fractions in their simplest form4. Convert simple fractions to decimals (up to 2 decimal places) and vice versa eg $\frac{1}{2}, \frac{1}{4}, \frac{1}{5}, \frac{1}{10}$ and multiples of these fractions5. Add and subtract simple fractions (with the same denominator, excluding mixed fractions)6. Multiply a fraction by a positive integer, and find a fraction of a whole number quantity (positive integers only)

Topic	Concepts and skills
5. Percentages	<ol style="list-style-type: none"> 1. Read, write, order and compare simple percentages, eg 10%, 25%, 20%, 50% and 75% 2. Use equivalencies between decimals, fractions and percentages eg $25\% = \frac{1}{4} = 0.25$ 3. Work out simple percentages of quantities, including VAT
6. Money	<ol style="list-style-type: none"> 1. Read, write, order and compare money 2. Add, subtract, multiply and divide quantities of money, household finance, utility bills, shopping bills, interest (for 1 year)
7. Time	<ol style="list-style-type: none"> 1. Read, measure and record time using digital and analogue clocks in 12-hour and 24-hour format 2. Use units of time including seconds, minutes, hours, days, weeks, months and years 3. Work out intervals of time and convert between units of time 4. Read, measure and record events on calendars
8. Measures	<ol style="list-style-type: none"> 1. Know and use units of measure for length, weight, angles, capacity, temperature, including metric and imperial units eg imperial units include miles, inches, feet, pounds, gallons and pints 2. Add and subtract units of measure 3. Convert units of measure in the metric system 4. Read integer scales 5. Draw and measure lines and angles, accurate to the nearest cm and degree
9. Area & Perimeter	<ol style="list-style-type: none"> 1. Work out the perimeter of rectangles and shapes made from rectangles 2. Work out the area of rectangles and shapes made from rectangles
10. Volume	<ol style="list-style-type: none"> 1. Work out the volume of a cuboid
11. Tables & Charts	<ol style="list-style-type: none"> 1. Read, construct and use everyday tables and charts, eg mileage charts, bar charts, line graphs, currency conversion tables and timetables (bus, train and airlines)

The Edexcel Award in Number and Measure

Level 2 (ANM20)

Scheme of work

Level 2 course overview

The table below shows an overview of modules in the Level 2 scheme of work.

Teachers should be aware that the estimated teaching hours are **approximate** and should be used as a guideline only.

Module number	Title	Estimated teaching hours
1	Number size and rounding	2.5
2	Integers and the 4-rules	6
3	Decimals	5
4	Reading scales	3.5
5	Converting units	5
6	Tables and charts	4
7	Types of number	6
8	Fractions	6
9	Fractions, decimals and percentages	4
10	Percentages and applications	7
11	Ratio and proportion	6
12	Perimeter and area	7
13	Volume	4
	Total	66

Awards Tier: Level 2

Contents: Number size and rounding

- 1.3 Multiply and divide positive integers by 10, 100, 1000
- 1.6 Round positive integers to the nearest 10, 100 and 1000
- 1.9 Read, write, order and compare positive and negative integers of any size
- 3.2 Check solutions to questions and problems by using suitable approximations

GCSE SPECIFICATION REFERENCES

- N1 Order positive and negative integers ...; use the symbols =, ≠, <, >, ≤, ≥
- N2 Understand and use place value
- N14 Estimate answers; check calculations using approximation and estimation, including answers obtained using technology
- N15 Round numbers ... to an appropriate degree of accuracy ...

PRIOR KNOWLEDGE

The ability to order numbers

An appreciation of place value

Knowledge of integer complements to 10 and to 100

LINKS TO LEVEL 1 CONTENT

Read, write, order and compare positive integers up to 1000

Know multiplication and division facts up to 10×10

Check solutions to questions and problems by considering whether the answer is sensible

Read, write, order and compare money

OBJECTIVES

By the end of the module the student should be able to:

- Use and order positive and negative numbers
- Write numbers in words and write numbers from words
- Multiply or divide any number by powers of 10
- Round whole numbers to the nearest 10, 100 and 1000
- Check calculations by rounding, eg $29 \times 31 \approx 30 \times 30$

LINKS TO GCSE SCHEME OF WORK (2-year)

Foundation Unit 1a

DIFFERENTIATION & EXTENSION

Estimate answers to calculations involving the four rules of operation

Try investigations with digits 3, 7, 5 and 2 and challenge students to find the biggest number, smallest odd number, the largest sum or product etc

Round answers to appropriate degrees of accuracy to suit the context of the question

Work with larger denominations of bills (£5, £10, £20, £50 etc)

Estimates linked to shopping and bill calculations

NOTES

Present all working clearly

Awards Tier: Level 2

Contents: Integers and the 4-rules

- 1.8 Understand negative numbers and use a number line to order, add and subtract negative numbers
- 1.10 Add, subtract, multiply and divide integers of any size
- 1.11 Multiply and divide using negative integers

GCSE SPECIFICATION REFERENCES

- N1 Order ... negative integers, decimals and fractions; use the symbols =, ≠, <, >, ≤, ≥
- N2 Apply the four operations, including formal written methods, to integers ... – both positive and negative ...

PRIOR KNOWLEDGE

Experience of the four operations using whole numbers

Knowledge of integer complements to 10 and to 100

Knowledge of strategies for multiplying and dividing whole numbers by 2, 4, 5 and 10

LINKS TO LEVEL 1 CONTENT

Add and subtract positive integers

Multiply and divide by positive integers (single digit multiplier and divisor for non-calculator section)

OBJECTIVES

By the end of the module the student should be able to:

- Add and subtract integers, including negative numbers
- Multiply or divide any number by powers of 10
- Multiply and divide positive and negative numbers
- Add, subtract, multiply and divide negative numbers

LINKS TO GCSE SCHEME OF WORK (2-year)

Foundation Unit 1a

DIFFERENTIATION & EXTENSION

Estimate answers to calculations involving the four rules of operation

Directed number work with multi-step calculations

Encourage effective use of a calculator

NOTES

Present all working clearly

For non-calculator methods, ensure that remainders are shown as evidence of working

Show what is entered into your calculator, not just the answer

Try different methods from traditional ones, eg Russian or Chinese methods for multiplication

Incorporate Functional Elements whenever and wherever possible and always round measures to an appropriate degree of accuracy

Calculations related to shopping and bills, and practical applications such as darts and other games involving mathematical calculations

Awards Tier: Level 2

Contents: Decimals

- 2.4 Divide decimals with up to two decimal places, using a calculator
- 2.5 Multiply decimals with up to two decimal places (two digit multiplier and divisor for non-calculator section)
- 2.6 Round decimals to two decimal places
- 2.7 Add and subtract any decimal
- 3.2 Check solutions to questions and problems by using suitable approximations
- 7.3 Add, subtract, multiply and divide quantities of money, household finance, utility bills, shopping bills

GCSE SPECIFICATION REFERENCES

- N1 Order ... decimals ...; use the symbols =, ≠, <, >, ≤, ≥
- N2 Apply the four operations, including formal written methods, to ... decimals ... – ... both positive and negative; understand and use place value (eg when working with very large or very small numbers, and when calculating with decimals)
- N13 Use standard units of ... money using decimal quantities where appropriate
- N14 Estimate answers; check calculations using approximation and estimation, including answers obtained using technology
- N15 Round numbers and measures to an appropriate degree of accuracy (eg to a specified number of decimal places or significant figures)
- G14 Use standard units of measure ... (... money ...)

PRIOR KNOWLEDGE

The concept of a decimal

The four operations

LINKS TO LEVEL 1 CONTENT

Read, write, order and compare decimals up to two decimal places, and understand place value

Add and subtract decimals up to two decimal places

Multiply decimals with up to two decimal places (single digit whole number multiplier for non-calculator section)

OBJECTIVES

By the end of the module the student should be able to:

- Understand place value, identifying the values of the digits
- Write decimals in order of size
- Round decimals to the nearest integer or up to two decimal places
- Add and subtract decimals
- Multiply and divide decimal numbers by integers and decimal numbers
- Check their answers by rounding, eg $9.8 \times 17.2 \approx 10 \times 17$

LINKS TO GCSE SCHEME OF WORK (2-year)

Foundation Unit 1b

DIFFERENTIATION & EXTENSION

Practice long multiplication and division without using a calculator

Use decimals in real-life problems as much as possible, eg money problems

Use functional examples such as entry into theme parks, cost of holidays, sharing the cost of a meal

Money calculations that require rounding answers to the nearest penny

Multiply and divide decimals by decimals with more than two decimal places

NOTES

Advise students not to round decimals used in calculations until stating them in the final answer

For non-calculator methods ensure that remainders are shown as evidence of working

Link decimals to reading scales and converting units

Awards Tier: Level 2

Contents: Reading scales

9.5 Draw lines and angles, accurate to the nearest cm and degree

9.6 Read decimal scales

GCSE SPECIFICATION REFERENCES

N13 Use standard units of mass, length, time, money and other measures ... using decimal quantities where appropriate

G14 Use standard units of measure and related concepts (length, area, volume/capacity, mass, time, money, etc.)

G15 Measure line segments and angles in geometric figures ...

PRIOR KNOWLEDGE

An awareness of the imperial system of measures

LINKS TO LEVEL 1 CONTENT

Read, measure and record time using digital and analogue clocks in 12-hour and 24-hour format

Know and use units of measure for length, weight, angles, capacity, temperature, including metric and imperial units

Read integer scales

OBJECTIVES

By the end of the module the student should be able to:

- Interpret scales on a range of measuring instruments including: mm, cm, m, km, ml, cl, l, mg, g, kg, tonnes, °C, time
- Indicate given values on a scale

LINKS TO GCSE SCHEME OF WORK (2-year)

Foundation Unit 6a, 8 (prior knowledge)

DIFFERENTIATION & EXTENSION

This could be made a practical activity by collecting assorted everyday items and then weighing and measuring them to check the estimates of their lengths, weights and volumes

Use the internet to find the weights, volumes and heights of large structures such as buildings, aeroplanes and ships

Take the opportunity to do some real measuring/estimating around school

NOTES

Measurement is essentially a practical activity

Use a range of everyday objects to bring reality to lessons

Use Functional Elements as a source of practical activities

Provide opportunities for students to select the unit of measure to use, particularly where they have a choice of imperial or metric measure, eg height and weight of a person

Awards Tier: Level 2

Contents: Converting units

- 9.1 Know and use units of measure for length, weight, angles, capacity, temperature, including metric and imperial units and degrees
eg imperial units include miles, inches, feet, pounds, gallons and pints
- 9.3 Convert units of measure in its same systems
- 9.7 Convert between metric and imperial units
eg 5 miles = 8 km
12 inches = 1 foot = 30 cm
2.2 pounds = 1 kg
8 pints = 1 gallon = 4.5 litres

GCSE SPECIFICATION REFERENCES

- N13 Use standard units of mass, length, time, money and other measures ... using decimal quantities where appropriate
- R1 Change freely between related standard units (eg time, length, area, volume/capacity, mass) ... in numerical ... contexts
- G14 Use standard units of measure and related concepts (length, area, volume/capacity, mass, time, money, etc.)

PRIOR KNOWLEDGE

An awareness of the imperial system of measures

Strategies for multiplying and dividing by 10 (for converting metric units)

LINKS TO LEVEL 1 CONTENT

Use units of time including seconds, minutes, hours, days, weeks, months and years

Work out intervals of time and convert between units of time

Read, measure and record events on calendars

Add and subtract units of measure

OBJECTIVES

By the end of the module the student should be able to:

- Know that measurements using real numbers depend upon the choice of unit
- Convert units within one system
- Convert metric units to metric units (metric equivalents should be known)
- Convert imperial units to imperial units (NB: Conversion between imperial units will be given)
- Convert between metric and imperial measures
- Convert using metric equivalents of pounds, feet, miles, pints and gallons:

Metric	Imperial
1 kg	2.2 pounds
1 l	1.75 pints
4.5 l	1 gallon
8 km	5 miles
30 cm	1 foot

LINKS TO GCSE SCHEME OF WORK (2-year)

Foundation Unit 8

DIFFERENTIATION & EXTENSION

Convert and compare actual measurements taken in both metric and imperial measure

Use conversions for height and weight of students, cars, bridges etc

Combine with simple scales such as 1 cm to 1 m for classrooms, playing fields, bedrooms

Ask them to draw a plan of their ideal design for their bedrooms, including the furniture

NOTES

Measurement is essentially a practical activity

Use a range of everyday objects to bring reality to lessons

Use Functional Elements as a source of practical activities

Awards Tier: Level 2

Contents: Tables and charts

- 12.1 Read, write and use everyday tables, charts eg mileage charts, bar charts, line graphs, currency conversion tables and timetables (bus, train and airlines).
- 12.2 Draw and interpret pie charts and frequency tables

GCSE SPECIFICATION REFERENCES

- R10 Solve problems involving direct and inverse proportion, including graphical ... representations
- S2 Interpret and construct tables, charts and diagrams, including frequency tables, bar charts, pie charts and pictograms for categorical data, vertical line charts for ungrouped discrete numerical data, tables and line graphs for time series data and know their appropriate use

PRIOR KNOWLEDGE

An understanding of why data needs to be collected and some idea about different types of graphs

LINKS TO LEVEL 1 CONTENT

Read, write and use everyday tables and charts, eg mileage charts, bar charts, line graphs, currency conversion tables and timetables (bus, train and airlines)

OBJECTIVES

By the end of the module the student should be able to:

- Draw:
 - Bar charts
 - Mileage charts
 - Line graphs
 - Pie charts
- Interpret:
 - Bar charts
 - Mileage charts
 - Line graphs
 - Conversion table and charts
 - Pie charts

LINKS TO GCSE SCHEME OF WORK (2-year)

Foundation Units 3a and 3b

DIFFERENTIATION & EXTENSION

Carry out a statistical investigation of their own and use an appropriate means of displaying the results

Use a spreadsheet to draw different types of graphs

Collect examples of charts and graphs in the media which have been misused and discuss the implications

Dividing objects up into fraction parts, eg circles, pizza, cakes

Use of calendars for planning exercises, eg holiday planning, scheduling

NOTES

Reiterate that clear presentation with axes correctly labeled is important, and to use a ruler to draw straight lines

Make comparisons between previously collected data

Encourage group work and presenting their charts (useful display material for classrooms or corridors)

Use Excel Graph wizard

Consider Functional Elements by comparing rainfall charts, distribution of ages in cinemas etc

Awards Tier: 2

Contents: Types of number

- 1.7 Understand and use multiples, factors, common factors and prime numbers
- 1.12 Find the Highest Common Factor and Lowest Common Multiple of any two positive integers
- 1.13 Read, write and use squares, cubes and square roots
- 1.14 Read, write and use index notation for small positive integer powers

GCSE SPECIFICATION REFERENCES

- N4 Use the concepts and vocabulary of prime numbers, factors (divisors), multiples, common factors, common multiples, highest common factor, lowest common multiple, prime factorisation, including using product notation and the unique factorisation theorem
- N6 Use positive integer powers and associated real roots (square, cube ...), recognise powers of 2, 3, 4, 5
- N7 Calculate with roots, and with integer ... indices

PRIOR KNOWLEDGE

Number complements to 10 and multiplication/division facts
Recognise basic number patterns
Experience of classifying integers

LINKS TO LEVEL 1 CONTENT

Know multiplication and division facts up to 10×10

OBJECTIVES

By the end of the module the student should be able to:

- Recognise even and odd numbers
 - Identify factors, multiples and prime numbers
 - Find the common factors and common multiples of two numbers
 - Find the Highest Common Factor (HCF) and Lowest Common Multiple (LCM) of two positive integers
 - Recall integer squares up to 15×15 and the corresponding square roots
 - Recall the cubes of 2, 3, 4, 5 and 10
 - Find squares and cubes
 - Find square roots and cube roots
 - Use index notation for squares and cubes
 - Use index notation for powers of 10
-
- Find the value of calculations using indices

LINKS TO GCSE SCHEME OF WORK (2-year)

Foundation Units 1a, 1c and 1d

DIFFERENTIATION & EXTENSION

Calculator exercise to check factors of larger numbers

Use prime factors to find LCM

Use a number square to find primes (sieve of Eratosthenes)

Calculator exercise to find squares, cubes and square roots of larger numbers (using trial and improvement)

NOTES

All of the work in this module can be easily reinforced by using it as 'starters' or 'plenaries'

Calculators should be used only when appropriate

There is plenty of investigative work using squares like 'half-time' scores

Awards Tier: 2

Contents: Fractions

- 4.2 Use equivalent fractions
- 4.7 Multiply fractions, including mixed numbers
- 4.8 Divide fractions, including mixed numbers, using a calculator
- 4.9 Add and subtract fractions with different denominators and mixed numbers
- 4.10 Use fractions to compare quantities
- 4.11 Express one number as a fraction of another

GCSE SPECIFICATION REFERENCES

- N1 Order positive and negative ... fractions; use the symbols =, ≠, <, >, ≤, ≥
- N2 Apply the four operations, including formal written methods, to ... simple fractions (proper and improper), and mixed numbers – all both positive and negative ...
- N8 Calculate exactly with fractions ...
- N12 Interpret fractions and percentages as operators
- R3 Express one quantity as a fraction of another, where the fraction is less than 1 or greater than 1

PRIOR KNOWLEDGE

Multiplication facts

Ability to find common factors

A basic understanding of fractions as being 'parts of a whole unit'

Use of a calculator with fractions

LINKS TO LEVEL 1 CONTENT

Read, write, order and compare fractions and mixed numbers

Write fractions in their simplest form

OBJECTIVES

By the end of the module the student should be able to:

- Visualise a fraction diagrammatically
- Understand a fraction as part of a whole
- Recognise and write fractions in everyday situations
- Find fractions of amounts
- Write a fraction in its simplest form and find equivalent fractions
- Compare the sizes of fractions using a common denominator
- Add and subtract fractions by using a common denominator
- Write an improper fraction as a mixed number
- Multiply and divide fractions
- Write one number as a fraction of another

LINKS TO GCSE SCHEME OF WORK (2-year)

Foundation Unit 4a

DIFFERENTIATION & EXTENSION

Careful differentiation is essential as this topic is dependent on the student's ability

Relate simple fractions to percentages and vice versa

Work with improper fractions and mixed numbers, eg divide 5 pizzas between 3 people

Solve real-life problems and word problems involving fractions, eg finding a perimeter from a shape with fractional side lengths

Link fractions with probability questions

NOTES

Regular revision of fractions is essential

Demonstrate how to use the fraction button on a calculator in order to be able to check solutions

Use real-life examples whenever possible

Awards Tier: Level 2

Contents: Fractions, decimals and percentages

- 4.4 Convert simple fractions to decimals (up to 2 decimal places) and vice versa
eg $\frac{1}{2}, \frac{1}{4}, \frac{1}{5}, \frac{1}{10}$ and multiples of these fractions
- 5.2 Use equivalencies between decimals (up to 2 decimal places) fractions and percentages eg $25\% = \frac{1}{4} = 0.25$

GCSE SPECIFICATION REFERENCES

- N10 Work interchangeably with terminating decimals and their corresponding fractions (such as 3.5 and $\frac{7}{2}$ or 0.375 and $\frac{3}{8}$) ...
- R9 Define percentage as 'number of parts per hundred'; interpret percentages and percentage changes as a fraction or a decimal ...

PRIOR KNOWLEDGE

Four operations of number
The concepts of a fraction and a decimal
Number complements to 10 and multiplication tables
Awareness that percentages are used in everyday life

LINKS TO LEVEL 1 CONTENT

Read, write, order and compare simple percentages

OBJECTIVES

- By the end of the module the student should be able to:
- Understand that a percentage is a fraction in hundredths
 - Convert between fractions, decimals and percentages

LINKS TO GCSE SCHEME OF WORK (2-year)

Foundation Unit 4a

DIFFERENTIATION & EXTENSION

Consider fractions and percentages of amounts, eg $12.5\% = 0.125 = \frac{1}{8}$

Consider percentages which convert to recurring decimals, eg $33\frac{1}{3}\%$, and situations which lead to percentages of more than 100%

Use fraction, decimal and percentage dominos or follow me cards

Investigate the many uses of percentages, particularly in the media

Practice the ability to convert between different forms

Use of a fraction board to compare fractions and decimals

NOTES

Use Functional Elements questions using fractions, eg $\frac{1}{4}$ off the list price when comparing different sale prices

Keep using non-calculator methods, eg start with 10%, then 1% in order to reach the required percentages

Awards Tier: 2

Contents: Percentages and applications

- 5.4 Find percentages of quantities of any value
- 5.5 Calculate percentage increase and decrease
- 5.6 Express one number as a percentage of another
- 7.5 Calculate simple interest
- 7.6 Calculate wages and salaries, including national insurance and tax deductions

GCSE SPECIFICATION REFERENCES

- R9 Define percentage as 'number of parts per hundred'; interpret percentages and percentage changes as a fraction or a decimal, and interpret these multiplicatively; express one quantity as a percentage of another; ... solve problems involving percentage change, including percentage increase/decrease ..., and simple interest including in financial mathematics

PRIOR KNOWLEDGE

Four operations of number
The concepts of a fraction and a decimal
Number complements to 10 and multiplication tables
Awareness that percentages are used in everyday life

LINKS TO LEVEL 1 CONTENT

Work out simple percentages of quantities, including VAT

OBJECTIVES

By the end of the module the student should be able to:

- Use percentages to solve problems
- Convert between fractions, decimals and percentages
- Find a percentage of a quantity
- Find percentage increase or decrease
- Use percentages in real-life situations, eg simple interest
- Write one number as a percentage of another

LINKS TO GCSE SCHEME OF WORK (2-year)

Foundation Unit 4b

DIFFERENTIATION & EXTENSION

Use a mixture of calculator and non-calculator methods

Use ideas for wall display, students make up their own poster to explain say a holiday reduction

Use Functional Elements questions to look at questions in context

Problems which lead to the necessity of rounding to the nearest penny, eg real-life contexts

NOTES

Use plenty of practical examples that can be linked to Functional Elements, eg VAT calculations

Awards Tier: Level 2**Contents: Ratio and proportion**

- 6.1 Use direct proportion in simple problems
- 6.2 Use ratio notation
- 6.3 Divide a quantity into 2 or 3 parts in a given ratio
- 7.4 Convert between currencies

GCSE SPECIFICATION REFERENCES

- N13 Use standard units of ... money using decimal quantities where appropriate
- R4 Use ratio notation, including reduction to simplest form
- R5 Divide a given quantity into two parts in a given part:part or part:whole ratio; express the division of a quantity into two parts as a ratio; apply ratio to real contexts and problems (such as those involving conversion, comparison, scaling, mixing, concentrations)
- R7 Understand and use proportion as equality of ratios
- R10 Solve problems involving direct ... proportion, including graphical and algebraic representations
- G14 Use standard units of measure ... (... money ...)

PRIOR KNOWLEDGE

Using the four operations

Ability to recognise common factors

Knowledge of fractions

LINKS TO LEVEL 1 CONTENT

Multiply and divide by positive integers (single digit multiplier and divisor for non-calculator section)

Use equivalencies between decimals, fractions and percentages, eg $25\% = \frac{1}{4} = 0.25$

OBJECTIVES

By the end of the module the student should be able to:

- Understand what is meant by ratio and use ratios
- Write a ratio in its simplest form and find an equivalent ratio
- Solve a ratio problem in context, eg recipes
- Share a quantity in a given ratio
- Solve problems involving money conversions, eg £'s to Euros

LINKS TO GCSE SCHEME OF WORK (2-year)

Foundation Units 11a and 11b

DIFFERENTIATION & EXTENSION

Plan a housing estate with a variety of different sized houses

Currency calculations using foreign exchange rates

Link ratios and proportion to Functional Elements, eg investigate the proportion of different metals in alloys, the ingredients needed for recipes for fewer or more people, mixing cement, planting forests, comparing prices of goods here and abroad, medicines

NOTES

Students often find ratios with 3 parts difficult

Ratios can also be dealt with by considering multiples

Can be linked to work on metric and imperial units

Awards Tier: Level 2

Contents: Perimeter and area

- 2.6 Round decimals to two decimal places
- 10.3 Work out the area and perimeter of rectangles, triangles, circles and semi-circles
- 10.4 Work out areas of composite shapes made from rectangles, triangles, circles and/or semi-circles

GCSE SPECIFICATION REFERENCES

- N15 Round numbers and measures to an appropriate degree of accuracy (eg to a specified number of decimal places or significant figures) ...
- G9 Identify and apply circle definitions and properties, including: centre, radius, chord, diameter, circumference ...
- G16 Know and apply formulae to calculate: area of triangles ...
- G17 Know the formulae: circumference of a circle = $2\pi r = \pi d$, area of a circle = πr^2 ; calculate: perimeters of 2D shapes, including circles; areas of circles and composite shapes ...

PRIOR KNOWLEDGE

- Names of triangles and quadrilaterals
- Properties of rectangles, parallelograms and triangles
- Concept of perimeter and area
- Units of measurement
- Four operations of number

LINKS TO LEVEL 1 CONTENT

- Work out the perimeter of rectangles and shapes made from rectangles
- Work out the area of rectangles and shapes made from rectangles

OBJECTIVES

By the end of the module the student should be able to:

- Find the perimeter of shapes
- Find the perimeter of compound shapes
- Find the area by counting squares
- Recall and use the formulae for the area of a triangle and a rectangle
- Calculate areas of compound shapes made from triangles and rectangles
- Solve a range of problems involving areas including cost of carpet type questions
- Recall the definition of a circle and identify parts of a circle
- Find circumferences of circles and areas enclosed by circles
- Use $\pi \approx 3.142$ or use the π button on a calculator
- Find the perimeters and areas of semicircles and quarter circles

LINKS TO GCSE SCHEME OF WORK (2-year)

Foundation Units 8 and 17

DIFFERENTIATION & EXTENSION

Further problems involving combinations of shapes

Use combinations of shapes where not all the lengths needed are given (but can be deduced)

Use practical examples from functional papers on topics such as turfing a garden, carpeting a room, laying carpet tiles on a floor

Perimeter questions could use skirting board, wallpaper, planting a border of a garden

NOTES

Discuss the correct use of language and units, particularly when method marks are for the correct unit of measure

Ensure that students can distinguish between perimeter and area

Practical examples help to clarify the concepts, eg floor tiles

Awards Tier: Level 2

Contents: Volume

11.1 Volumes of prisms and cylinders

GCSE SPECIFICATION REFERENCES

G16 Know and apply formulae to calculate ... volume of cuboids and other right prisms (including cylinders)

PRIOR KNOWLEDGE

Concept of volume

Concept of prism

Experience of constructing cubes or cuboids from multi-link

LINKS TO LEVEL 1 CONTENT

Work out the volume of a cuboid

OBJECTIVES

By the end of the module the student should be able to:

- Recall and use formulae for the volume of cubes and cuboids
- Calculate the volumes of right prisms and shapes made from cubes and cuboids
- Calculate the volume of a cylinder

LINKS TO GCSE SCHEME OF WORK (2-year)

Foundation Units 8 and 17

DIFFERENTIATION & EXTENSION

Look at practical examples such as fish tanks, filling containers, finding the number of small boxes that fit into a large box

Further problems involving a combination of shapes

NOTES

Discuss the correct use of language and units

Remind students that there is often a mark attached to writing down the correct unit

Use practical problems to enable the students to understand the difference between perimeter, area and volume

Use Functional Elements problems, eg filling a water tank, optimisation type questions

Level 2 concepts and skills

What students need to learn:

Level 1 content is shown in *italics*

Level 2 content is shown in **bold**

Topic	Concepts and skills
1. Integers	<ol style="list-style-type: none"><i>1. Read, write, order and compare positive integers up to 1000</i><i>2. Add and subtract positive integers</i><i>3. Multiply and divide positive integers by 10, 100, 1000</i><i>4. Multiply and divide positive integers (single digit multiplier and divisor for non-calculator section)</i><i>5. Know multiplication and division facts up to 10×10</i><i>6. Round positive integers to the nearest 10, 100 and 1000</i><i>7. Understand and use multiples, factors, common factors and prime numbers</i><i>8. Understand negative numbers and use a number line to order, add and subtract negative numbers</i>9. Read, write, order and compare positive and negative integers of any size10. Add, subtract, multiply and divide integers of any size11. Multiply and divide using negative integers12. Find the Highest Common Factor and Lowest Common Multiple of any two positive integers13. Read, write and use squares, cubes and square roots14. Read, write and use index notation for small positive integer powers
2. Decimals	<ol style="list-style-type: none"><i>1. Read, write, order and compare decimals up to two decimal places and understand place value</i><i>2. Add and subtract decimals up to two decimal places</i><i>3. Multiply decimals with up to two decimal places (single digit whole number multiplier for non-calculator section)</i><i>4. Divide decimals with up to two decimal places, using a calculator</i>5. Multiply decimals with up to two decimal places (two digit multiplier and divisor for non-calculator section)6. Round decimals to two decimal places7. Add and subtract any decimal

Topic	Concepts and skills
3. Approximation	<ol style="list-style-type: none"> 1. <i>Check solutions to questions and problems by considering whether the answer is sensible</i> 2. Check solutions to questions and problems by using suitable approximations
4. Fractions	<ol style="list-style-type: none"> 1. <i>Read, write, order and compare fractions and mixed numbers</i> 2. <i>Use equivalent fractions</i> 3. <i>Write fractions in their simplest form</i> 4. <i>Convert simple fractions to decimals (up to 2 decimal places) and vice versa eg $\frac{1}{2}, \frac{1}{4}, \frac{1}{5}, \frac{1}{10}$ and multiples of these fractions</i> 5. <i>Add and subtract simple fractions with the same denominator, excluding mixed numbers</i> 6. <i>Multiply a fraction by a positive integer, and find a fraction of a whole number quantity (positive integers only)</i> 7. Multiply fractions, including mixed numbers 8. Divide fractions, including mixed numbers, using a calculator 9. Add and subtract fractions with different denominators and mixed numbers 10. Use fractions to compare quantities 11. Express one number as a fraction of another
5. Percentages	<ol style="list-style-type: none"> 1. <i>Read, write, order and compare simple percentages</i> 2. <i>Use equivalencies between decimals (up to 2 decimal places) fractions and percentages eg $25\% = \frac{1}{4} = 0.25$</i> 3. <i>Work out percentages of quantities, including VAT</i> 4. Find percentages of quantities of any value 5. Calculate percentage increase and decrease 6. Express one number as a percentage of another
6. Ratio & Proportion	<ol style="list-style-type: none"> 1. Use direct proportion in simple problems 2. Use ratio notation 3. Divide a quantity into 2 or 3 parts in a given ratio
7. Money	<ol style="list-style-type: none"> 1. <i>Read, write, order and compare money</i> 2. <i>Round money in calculations to the nearest penny</i> 3. <i>Add, subtract, multiply and divide quantities of money, household finance, utility bills, shopping bills, interest (for 1 year)</i>

Topic	Concepts and skills
	4. Convert between currencies 5. Calculate simple interest 6. Calculate wages and salaries, including national insurance and tax deductions
8. Time	1. <i>Read, measure and record time using digital and analogue clocks in 12-hour and 24-hour format</i> 2. <i>Convert units of time including seconds, minutes, hours, days, weeks, months and years</i> 3. <i>Work out intervals of time</i> 4. <i>Read, measure and record events on calendars</i>
9. Measures	1. <i>Know and use units of measure for length, weight, angles, capacity, temperature, including metric and imperial units and degrees eg imperial units include miles, inches, feet, pounds, gallons and pints</i> 2. <i>Add and subtract measures</i> 3. <i>Convert units of measure in its same systems</i> 4. <i>Read integer scales</i> 5. <i>Draw lines and angles, accurate to the nearest cm and degree</i> 6. Read decimal scales 7. Convert between metric and imperial units eg 5 miles = 8 km 12 inches = 1 foot = 30 cm 2.2 pounds = 1 kg 8 pints = 1 gallon = 4.5 litres
10. Area & Perimeter	1. <i>Work out the perimeter of rectangles and shapes made from rectangles</i> 2. <i>Work out the area of rectangles and shapes made from rectangles</i> 3. Work out the area and perimeter of rectangles, triangles, circles and semi-circles 4. Work out areas of composite shapes made from rectangles, triangles, circles and/or semi-circles
11. Volume	1. Volumes of prisms and cylinders
12. Tables & Charts	1. <i>Read, write and use everyday tables, charts eg mileage charts, bar charts, line graphs, currency conversion tables and timetables (bus, train and airlines)</i> 2. Draw and interpret pie charts and frequency tables

Resources Table

Level 1

Module number	Title	Resources	Web resources
1	Number size and rounding		
2	Integers and the 4-rules		
3	Decimals		
4	Reading scales		
5	Converting units		
6	Tables and charts		
7	Types of number		
8	Fractions		
9	Fractions, decimals and percentages		
10	Percentages and applications		
11	Perimeter and area		
12	Time and timetables		
13	Volume		

Level 2

Module number	Title	Resources	Web resources
1	Number size and rounding		
2	Integers and the 4-rules		
3	Decimals		
4	Reading scales		
5	Converting units		
6	Tables and charts		
7	Types of number		
8	Fractions		
9	Fractions, decimals and percentages		
10	Percentages and applications		
11	Ratio and proportion		
12	Perimeter and area		
13	Volume		

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