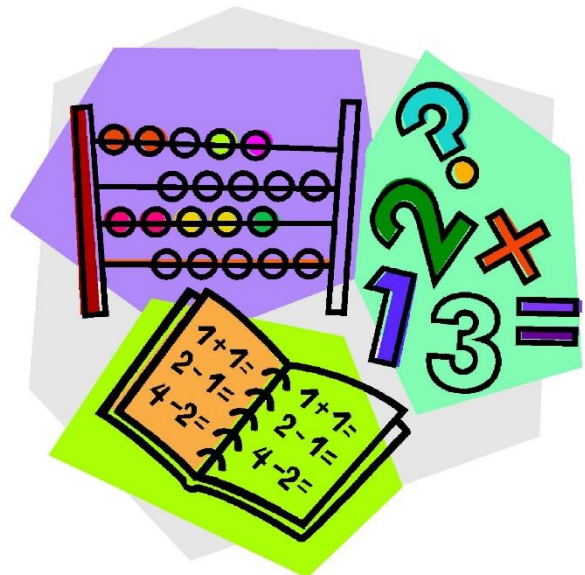# Braes High School

learners   contributors

Responsible   Confident

Numeracy across learning - BGE

Numeracy across learning at Braes High School

Numeracy is a proficiency which involves confidence and competence with numbers and measures. It is more than an ability to do basic arithmetic. It requires understanding of the number system, a repertoire of mathematical techniques and an inclination and ability to solve quantitative or spatial problems in a range of contexts. Numeracy also demands understanding of the ways in which data is gathered by counting and measuring and how it can be presented in graphs, diagrams, charts and tables.

With the introduction of a Curriculum for Excellence it is now the responsibility of all teaching staff to support and help deliver the numeracy across learning experiences and outcomes. To this end the maths department have prepared this booklet in an effort to support staff.

The numeracy across learning experiences and outcomes are divided into 8 organisers and are detailed individually in this booklet

The layout of the booklet is described below.

The 8 organisers which the numeracy across learning experiences and outcomes are into divided are,

Estimation and rounding Page 4
Departments involved alongside maths: biology, business education, chemistry, geography, history, modern studies, HE, ICT and physics.

Number and number processes Page 7
Departments involved alongside maths: biology, chemistry, design and technology, history, modern studies and physics.

Fractions, decimal fractions and percentages Page 10
Departments involved alongside maths: biology, business education, chemistry, geography, HE, PE and physics.

Money Page 14
Departments involved alongside maths: biology, business education, chemistry, geography, history, modern studies, HE, ICT and physics.

Time Page 17
Departments involved alongside maths: business education, geography, HE, ICT and physics.

Measurement Page 19
Departments involved alongside maths: biology, chemistry, design and technology, geography, HE and physics.

Data and analysis Page 22
Departments involved alongside maths: biology, business education, chemistry, English, geography, history, modern studies, ICT, PE and physics.

Ideas and chance of uncertainty Page 25
Departments involved alongside maths: biology, geography and physics.

Within the 8 organisers details have been provided from the maths department as to when the pupils are likely to cover this work in maths. However, as classes in the maths department are set from S1-S3 pupils may encounter the experiences and outcomes at slightly different stages in their school career.

Estimation and rounding

I can use my knowledge of rounding to routinely estimate the answer to a problem, then after calculating, decide if my answer is reasonable, sharing my solution with others. **MNU 2.01a**

I can round a number using an appropriate degree of accuracy, having taken into account the context of the problem. **MNU 3.01a**

Having investigated the practical impact of inaccuracy and error, I can use my knowledge of tolerance when choosing the required degree of accuracy to make real life calculations. **MNU 4.01a**

The estimation and rounding outcomes and experiences at levels 3 and 4 are currently being delivered by the following departments.

Department	Outcome	Stage	Context
Maths	MNU 3.01a	S1-S3	Rounding.
	MNU 4.01a	S3	Rounding.
Biology	MNU 3.01a	S1-S3	Rounding to the nearest whole number, simplifying ratios, percentages and averages.
Business Education	MNU 3.01a	S2-S3	Spreadsheets.
Chemistry	MNU 3.01a	S1-S3	Within Electrochemistry topic, rounding is involved when averaging data from cell voltage experiments. Acids and bases – concordant results in titrations are averaged and rounded. Rounding final answers in calculations.
Creative Arts	MNU 3.01a	S1	Rounding.
English and Media	MNU 3.01a	S1-S3	Solo talks, RUAE, persuasive writing when forming an argument.
Geography	MNU 3.01a	S2	Creating graphs e.g. amount of deaths.
	MNU 4.01a	S1	Calculating population density, creating graphs.
		S3	Creating and analysing graphs and population pyramids related to Kenya.
Health and Wellbeing	MNU 3.01a	S1 - 3	Weighing and measuring.
	MNU 4.01a	S1 - 3	Weighing and measuring.
History/Modern Studies	MNU 3.01a	S2-S3	Analysing data on immigration etc.
Physics	MNU 3.01a	S2	Electricity and Magnetism – rounding answers to an appropriate number of decimal places.
Technologies	MNU 3.01a	S3	Rounding within Python, functions and engineering science calculations, spreadsheets.
	MNU 4.01a	S1-S3	Within DET and Practical Craft skills – across the woodworking units and within Software Development – testing – expected and actual outputs.

Maths department support on estimation and rounding

By rounding a number we are setting all numbers after a given rounding figure to zero. To round a number look at the figure to the right of the chosen rounding figure. If it greater than **OR EQUAL TO** 5 then the chosen rounding figure should be rounded up. If the figure to the right is less than 5 then the chosen rounding figure should be left alone.

Example: Round 1326 to the nearest 10

2 is the chosen rounding figure as it is in the 10 column, 6 is the figure to the right.

6 is greater than 5 so the rounding figure needs rounded up from 2 to 3 and the figure to the right (6) is changed to 0.

1326 rounded to the nearest 10 is 1330.

The same rules are used for rounding to decimal places expect instead of thousands, hundreds, tens and units we use tenths, hundredths and thousandths.

Pupils often find rounding easier when placed in context. For large numbers football crowds or populations could be used. For 1 decimal place examples a ruler could be used (0.1 cm = 1mm) and for 2 decimal place examples money could be used (0.01 pounds = 1 pence).

Additional resources on estimation and rounding

Worksheets, power points and video lectures on rounding.
http://www.highlandlearning.org.uk/maths/?id=01&index=0

Additional support for learning resources on estimation and rounding

It can be helpful to draw diagrams or number lines to allow pupils to visualise rounding.

Example: Round 12.3 cm to the nearest cm.
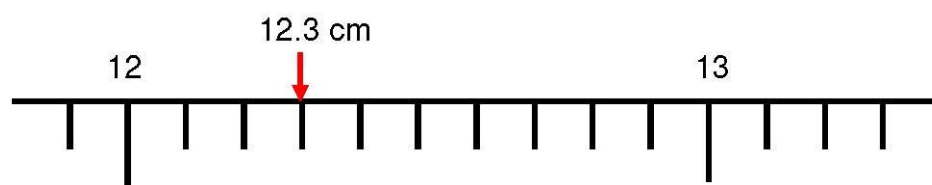
Pupils will be able to visualise that 12.3 cm is closer to 12 cm than 13 cm.

Number and number processes

I have extended the range of whole numbers I can work with and having explored how decimal fractions are constructed, can explain the link between a digit, its place and its value. **MNU 2-02a**

Having determined which calculations are needed, I can solve problems involving whole numbers using a range of methods, sharing my approaches and solutions with others. **MNU 2-03a**

I have explored the contexts in which problems involving decimal fractions occur and can solve related problems using a variety of methods. **MNU 2-03b**

I can show my understanding of how the number line extends to include numbers less than zero and have investigated how these numbers occur and are used. **MNU 2-04a**

I can use a variety of methods to solve number problems in familiar contexts, clearly communicating my processes and solutions. **MNU 3-03a**

I can continue to recall number facts quickly and use them accurately when making calculations. **MNU 3-03b**

I can use my understanding of numbers less than zero to solve simple problems in context. **MNU 3-04a**

Having recognised similarities between new problems and problems I have solved before, I can carry out the necessary calculations to solve problems set in unfamiliar contexts. **MNU 4-03a**

The number and number processes outcomes and experiences at levels 3 and 4 are currently being delivered by the following departments.

| Department	Outcome	Stage	Context
Maths	MNU 3.03a	S1	Addition, subtraction and multiplication of positive and negative numbers mentally and with a calculator.
	MNU 3.03b	S1	Recall facts used in money and measurement.
	MNU 3.04a	S1	Temperatures, dates and banking.
	MNU 4.03a	S1	Example contexts provided.
Biology	MNU 3.03a	S1	Percentages , averages, ratio.
	MNU 4.03a	S2-S3	Problem solving– Pupils practice many common styles of numeracy questions, learning the steps needed to answer them. E.g., Calculating an average.
Chemistry	MNU 3.03b	S1-S3	Use of data book, problem solving, valency method writing formula Remembering valency number from periodic table position, simplifying ratio and crossing over to achieve correct chemical formula. Ion formation – addition and subtraction of proton and electron numbers to obtain ion charge. Mass number & atomic number subtraction to achieve neutron numbers.
	MNU 3.04a	S1-S3	Melting & boiling point numbers used to predict states.
Design and Technology	MNU 4.03a	S2-S3	Scale drawing.
English and Media	MNU 3.03a	S1-S3	Specific Text – 'Curious incident of the dog in the night time'. Throughout starter tasks with the use of Scrabble to find the highest scoring word.
	MNU 4.03a	S1-S3	Imaginative writing: Calculating budgets and inflation for the future. RUAE: forming strategies to understand how many points are needed to receive all marks available.
Geography	MNU 3.03a	S3	Looking at population of different parts of Kenya and working out the percentage in each.
	MNU 3.03b	S3	Creating new graphs, working out correct graph and scale.
	MNU 3.04a	S3	Temperature.
Health and Wellbeing	MNU 3.03a	S1-S3	Numeracy task in Physical Education, weighing and measuring in Home Economics.
	MNU 4.03a	S1-S3	Numeracy task in Physical Education, weighing and measuring in Home Economics.
	MNU 3.03b	S1-S3	Numeracy task in Physical Education, work on knowledge of results and data gathering in S3 core/elective, weighing and measuring in Home Economics.
History	MNU 3.04a	S1-S3	What is History – Chronology, What is History – Centuries, Braes Anatomy – Chronology, put ancient civilisations in order, Germany – step to Hitler's rose to power.
Modern studies	MNU 3.03b	S1-S3	Recall number facts.
Physics	MNU 3.03a	S2-S3	Use of algebra to solve real world problems, Electricity and Magnetism – pupils are taught how to solve calculation problems and demonstrate working.
	MNU 3.03b	S2-S3	Recall speed of sound and speed of light, recall of UK mains voltage, speed of sound in air.
	MNU 4.03a	S1-S3	Obscure contexts to prove understanding, S3 Physics Waves calculations – using the definitions of wavelength, amplitude etc. to solve unfamiliar problems. S3 Electricity calculations – using circuit rules to solve unfamiliar problems.
Pupil Support	MNU 3.03a	S1-S3	Supporting a variety of subjects within 'The Shore'. Focus on problem solving.
	MNU 4.03a	S1-S3	Supporting a variety of subjects within 'The Shore'. Focus on problem solving.
RMPS	MNU 3.03a	S1-S2	Philosophy term one – code breaker challenge. Islam – term one Working out the amount of money given to charity by Muslims and the impact of this.

Maths department support on number and number processes

Pupils should understand what order mathematical operations should be carried out. This is done using BODMAS

First   B – brackets
           O – orders (squares and square roots)
           D – division
           M – multiplication
           A – addition
Last   S - subtraction

- -

When discussing negative numbers, temperature is an excellent context to use as pupils are aware of negative temperatures. A thermometer can be drawn on the board to highlight this before linking it to number lines and eventually to a wider range of contexts.
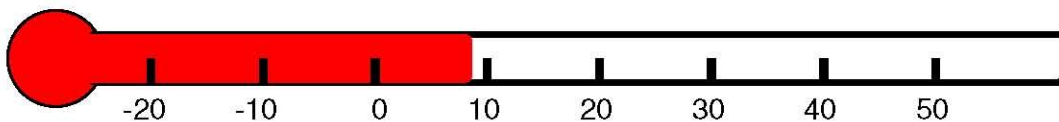
Additional resources on number and number processes

Worksheets, power points and video lectures on numerical processes.
http://www.highlandlearning.org.uk/maths/?id=03&index=0

Worksheets, power points and video lectures on negative numbers.
http://www.highlandlearning.org.uk/maths/?id=05&index=0

Worksheets, power points and video lectures on complex numerical processes.
http://www.highlandlearning.org.uk/maths/?id=10&index=0

Additional support for learning resources on number and number processes

When using number lines be aware that pupils may become confused if switching between horizontal and vertical lines. Lower ability pupils tend to find vertical number lines easier to understand.

Fractions, decimal fractions and percentages

I have investigated the everyday contexts in which simple fractions, percentages or decimal fractions are used and can carry out the necessary calculations to solve related problems. **MNU 2-07a**

I can show the equivalent forms of simple fractions, decimal fractions and percentages and can choose my preferred form when solving a problem, explaining my choice of method. **MNU 2-07b**

I can solve problems by carrying out calculations with a wide range of fractions, decimal fractions and percentages, using my answers to make comparisons and informed choices for real-life situations. **MNU 3-07a**

I can show how quantities that are related can be increased or decreased proportionally and apply this to solve problems in everyday contexts. **MNU 3-08a**

I can choose the most appropriate form of fractions, decimal fractions and percentages to use when making calculations mentally, in written form or using technology, then use my solutions to make comparisons, decisions and choices. **MNU 4-07a**

Using proportion, I can calculate the change in one quantity caused by a change in a related quantity and solve real-life problems. **MNU 4-08a**

The fractions, decimal fractions and percentages outcomes and experiences at levels 3 and 4 are currently being delivered by the following departments.

Department	Outcome	Stage	Context
Maths	MNU 3.07a	S1	Decimals, fractions and percentages.
	MNU 3.08a	S1-S3	Rates and ratios.
	MNU 4.07a	S1	Linking decimals, fractions and percentages.
	MNU 4.08a	S1-S2	Proportion and inverse proportion.
Biology	MNU 3.07a	S1-S3	Genetics, Problem solving (percentages)- Pupils are introduced to various styles of numeracy questions early on and practice these through S3 e.g. calculating percentages.
	MNU 4.08a	S1-S3	Graphing results.
Business Education	MNU 3.07a	S2-S3	Calculations in spreadsheets.
	MNU 3.08a	S2-S3	Calculations in spreadsheets.
Chemistry	MNU 3.07a	S2-S3	Real life chemical situations.
	MNU 3.08a	S2-S3	Everyday chemical contexts, The quantity of solute dissolved in a solvent and the effect it has on concentration of the solution.
	MNU 4.07a	S2-S3	Chemical calculations.
	MNU 4.08a	S2-S3	Chemical calculations.
Creative Arts	MNU 3.08a	S1-S3	Scale, proportion and dimensions.
English and Media	MNU 3.07a	S1-S3	For real life situations classes will often analyse statistics to form opinions and arguments.
	MNU 4.07a	S1-S3	For real life situations classes will often analyse statistics to form opinions and arguments.
Geography	MNU 3.07a	S1-S3	Calculating population density, working out percentages when looking at demographics across Kenya.
	MNU 4.07a	S3	Working out percentages when looking at demographics across Kenya.
	MNU 4.08a	S2-S3	Development indicators and proportion.
Home Economics	MNU 3.08a	S1-S3	Weighing and measuring.
	MNU 4.07a	S1-S3	Weighing and measuring.
	MNU 4.08a	S1-S3	Weighing and measuring.
Modern Studies	MNU 3.07a	S1	Democracy election results.
PE	MNU 3.07a	S2-S3	Heart rate training zones and success rates, data gathering.
	MNU 3.08a	S1-S3	Scoring work in activities related to performance and data gathering.
	MNU 4.08a	S1-S3	Scoring work in activities related to performance and data gathering.
Physics	MNU 3.07a	S2-S3	Voltage dividers and efficiency of systems.
	MNU 3.08a	S2-S3	Proving direct proportion between voltage applied across a resistor and current flowing through it (Ohm's Law).
	MNU 4.08a	S3	Using direct proportion between voltage applied across a resistor and current flowing through it (Ohm's Law).
Pupil Support	MNU 3.07a	S1-S3	Support the learning in class by teaching methodology used by the classroom teacher. This reinforces the processes required. Discussions with pupils about why these skills are important and relevant.
	MNU 4.07a	S1-S3	Support the learning in class by teaching methodology used by the classroom teacher. This reinforces the processes required. Discussions with pupils about why these skills are important and relevant.
RMPS	MNU 3.07a	S2-S3	Islam – term one We look at working out the amount of money given to charity by Muslims and the impact if this. Global Issues – Term two Calculating percentages, cost, usage etc. of water in Canada.
Technologies	MNU 3.07a	S2	S2 Programming, introduction to using decimal numbers in programming Engineering science.
	MNU 4.07a	S3	S3 Python – Engineering Science.

Maths department support on fractions, decimal fractions and percentages

Fractions

When finding fractions of a value the following method can be used,

Example: Find ¾ of £130

Solution: Find ¼ of £130 by dividing £130 by 4, = £35
              Multiply the ¼ by 3 to get ¾ so 3 x £35 = £105

High ability pupils should be able to do this example without the use of a calculator.

Decimal fractions

Example: What is 0.82 of 190?

This type of example would be done on a calculator.

Solution: (on calculator) 0.82 x 190 = 155.8

Example: What is 3.23 / 0.64?

The pupils should be reminded that it is the first number divided by the second number.

Solution: (on calculator) 3.23 / 0.64 = 5.05

Percentages

When finding a percentage of a quantity the percentage is divided by 100 and multiplied by the quantity.

Example: What is 18% of £120?

Solution: (on calculator) (18 / 100) x 120 = £21.60

Proportion

When dealing with quantities which are proportional a step by step approach is generally used.

Example: Two maps are separated by 3.2 cm on a map with a scale of 1:200 000, how far apart are the towns?

Solution: 1cm = 200 000cm
              3.2cm = 3.2 x 200 000cm = 640 000cm = 6400m = 6.4km

Additional resources on fractions, decimal fractions and percentages

Worksheets, power points and video lectures on percentages and proportion.
http://www.highlandlearning.org.uk/maths/?id=01&index=0

Additional support for learning resources on fractions, decimal fractions and percentages

When working on fractions, decimal fractions or percentages with lower ability pupils, pie charts and diagrams can be very useful. For example some pupils may have no idea of what an eighth is but if you drew a diagram of a pizza cut into eight slices they would see it very clearly.

For the fractions example on the previous page a pile of money equal to £130 could be drawn. It could then be split into 4 piles (4 x ¼) and then 4 of the quarters could be brought together to find the answer (3 x ¼ = ¾).
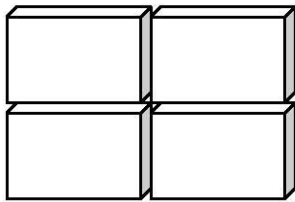
Total = £130   £35 per pile   3 piles = £105
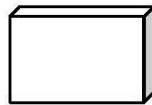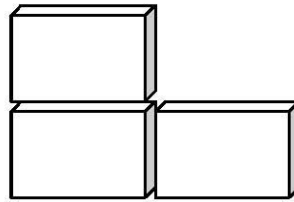
Ideally this sort of activity could even be done with monopoly money.

Money

The money outcomes and experiences at levels 3 and 4 are currently being delivered by the following departments.

I can manage money, compare costs from different retailers, and determine what I can afford to buy. **MNU 2-09a**

I understand the costs, benefits and risks of using bank cards to purchase goods or obtain cash and realise that budgeting is important. **MNU 2-09b**

I can use the terms profit and loss in buying and selling activities and can make simple calculations for this. **MNU 2-09c**

When considering how to spend my money, I can source, compare and contrast different contracts and services, discuss their advantages and disadvantages, and explain which offer best value to me. **MNU 3-09a**

I can budget effectively, making use of technology and other methods, to manage money and plan for future expenses. **MNU 3-09b**

I can discuss and illustrate the facts I need to consider when determining what I can afford, in order to manage credit and debt and lead a responsible lifestyle. **MNU 4-09a**

I can source information on earnings and deductions and use it when making calculations to determine net income. **MNU 4-09b**

I can research, compare and contrast a range of personal finance products and, after making calculations, explain my preferred choices. **MNU 4-09c**

Department	Outcome	Stage	Context
Maths	MNU 3.09a	S1-S3	Shopping and banking.
	MNU 3.09b	S1-S3	Budgeting.
	MNU 4.09a	S1	Loans, higher purchase and wages.
	MNU 4.09b	S2	Wages and income.
	MNU 4.09c	S2	Insurance, higher purchase and foreign exchange.
Business Education	MNU 3.09a	S2-S3	Spreadsheet analysis.
	MNU 4.09a	S2-S3	Spreadsheet formulae.
English and Media	MNU 4.09c	S3	Can be used in persuasive writing.
Geography	MNU 3.09a	S1	Looking at how does money affect different countries.
	MNU 4.09a	S3	Trade, trade deficits and trade surpluses.
	MNU 3.09b	S3	Budgeting for rebuilding Kibera shanty town.
	MNU 4.09b	S3	Looking at differences in developments across Kenya.
Home Economics	MNU 3.09a	S1-S3	Costing exam questions, food order and ordering work.
	MNU 3.09b	S3	Costing exam questions.
	MNU 4.09a	S2-S3	Costing discussions, lifestyle and budgeting.
	MNU 4.09b	S3	Costing exam questions.
	MNU 4.09c	S1-S3	Supermarket comparison.
ICT	MNU 3.09b	S1	Spreadsheets.
Pupil Support	MNU 3.09a	S1-S3	A large part of the transitions programmes is looking at life after school. Pupils are focused on employment skills, why employment is important and how managing their finances becomes a much more relevant topic for them.
	MNU 4.09a	S1-S3	A large part of the transitions programmes is looking at life after school. Pupils are focused on employment skills, why employment is important and how managing their finances becomes a much more relevant topic for them.
Technologies	MNU 3.09a	S2	Business – event planning.
	MNU 3.09b	S2	Business – event planning.

Maths department support on money

Many of the other examples in this booklet use money as a context.

Additional resources on money

Worksheets, power points and video lectures on money in a variety of contexts.
http://www.highlandlearning.org.uk/maths/?id=04&index=0

Additional support for learning resources on money

The use of monopoly money and giving the pupils the opportunity to use it in real life contexts will promote understanding.

Time

The time outcomes and experiences at levels 3 and 4 are currently being delivered by the

I can use and interpret electronic and paper-based timetables and schedules to plan events and activities, and make time calculations as part of my planning. **MNU 2-10a**

I can carry out practical tasks and investigations involving timed events and can explain which unit of time would be most appropriate to use. **MNU 2-10b**

Using simple time periods, I can give a good estimate of how long a journey should take, based on my knowledge of the link between time, speed and distance. **MNU 2-10c**

Using simple time periods, I can work out how long a journey will take, the speed travelled at or distance covered, using my knowledge of the link between time, speed and distance. **MNU 3-10a**

I can research, compare and contrast aspects of time and time management as they impact on me. **MNU 4-10a**

I can use the link between time, speed and distance to carry out related calculations. **MNU 4-10b**

following departments.

Department	Outcome	Stage	Context
Maths	MNU 3.10a	S1-S3	Time spans from hundredths of a second to years.
	MNU 4.10a	S1-S2	Small time intervals.
	MNU 4.10b	S2	Speed, distance and time calculations.
Biology	MNU 3.10a	S1-S3	Practice different examples of speed, distance and time calculations e.g. Braes anatomy distance, speed and time of sperm cells swimming and nerve impulse speeds.
Creative Arts	MNU 4.10a	S1-S3	Time management.
English and Media	MNU 4.10a	S1-S3	Time management, solo talks.
Geography	MNU 4.10a	S3	Changes in Kenya over time.
	MNU 4.10b	S2	Calculating river speed.
Home economics (hospitality)	MNU 4.10a	S1-S3	Time plans.
PE	MNU 3.10a	S1-S3	Athletics work – distance, speed and time for various events.
	MNU 4.10a	S1-S3	Athletics work – distance, speed and time for various events.
Physics	MNU 3.10a	S1-S3	Electricity & Magnetism- Speed, distance, time calculations, Waves calculations.
	MNU 4.10b	S1-S3	Electricity & Magnetism- Speed, distance, time calculations, Waves calculations.
RMPS	MNU 3.10a	S2	Islam – term 2, working out how long it would take to get to Mecca.
Technologies	MNU 3.10a	S3	Administration–journey planning and booking.
	MNU 4.10a	S3	S3 Business – HR unit – time management.

Maths department support on time

Speed, distance and time calculations should at first be done with small integers and no algebra. When introducing algebra is should again be used with small integers so that the pupils can follow what is going on. Once they can manipulate the equation comfortably more complex numbers and contexts can be introduced.

Additional resources on time

Worksheets, power points and video lectures on speed, distance and time calculations.
http://www.highlandlearning.org.uk/maths/?id=06&index=0

Additional support for learning resources on time

If pupils are planning events over a period of time then diagrams of clocks and calendars can be really useful in allowing the learners to visualise what is going on.

Measurement

The measurement outcomes and experiences at levels 3 and 4 are currently being

I can use my knowledge of the sizes of familiar objects or places to assist me when making an estimate of measure. **MNU 2-11a**

I can use the common units of measure, convert between related units of the metric system and carry out calculations when solving problems. **MNU 2-11b**

I can explain how different methods can be used to find the perimeter and area of a simple 2D shape or volume of a simple 3D object. **MNU 2-11c**

I can solve practical problems by applying my knowledge of measure, choosing the appropriate units and degree of accuracy for the task and using a formula to calculate area or volume when required. **MNU 3-11a**

I can apply my knowledge and understanding of measure to everyday problems and tasks and appreciate the practical importance of accuracy when making calculations. **MNU 4-11a**

delivered by the following departments:

| Department	Outcome	Stage	Context
Maths	MNU 3.11a	S1	Perimeters, areas and volumes of 2-D and 3D shapes.
	MNU 4.11a	S1	Length, area and scale drawings.
Biology	MNU 4.11a	S2-S3	Experimental work.
Chemistry	MNU 3.11a	S2-S3	Experimental work and calculations.
	MNU 4.11a	S6	Experimental measurement and uncertainties.
Design and Technology	MNU 4.11a	S2-S3	Drawing and designing.
Geography	MNU 3.11a	S1	Measuring and calculating scale on a map.
	MNU 4.11a	S2-S3	Wind speed and river speed.
Home Economics	MNU 3.11a	S1-S3	Measuring food.
	MNU 4.11a	S1-S3	Measuring food, Food Chemistry unit.
Physics	MNU 3.11a	S2-S3	Areas and volumes of shapes.
	MNU 4.11a	S1-S3	Experimental measurement and uncertainties.
Technologies	MNU 3.11a	S1-S3	Practical projects in DET, practical craft skills in Engineering Science.
	MNU 4.11a	S1-S3	Practical Craft Skills, Graphics.

Maths department support on measurement

When calculating areas or volumes in m^2 it is useful to convert all lengths to m before performing the calculation.

When talking about areas or volumes be very specific about how they are quoted. For example 3 cm^2 should be quoted as 3 square centimetres, not as it is actually written, which is 3 centimetres squared.
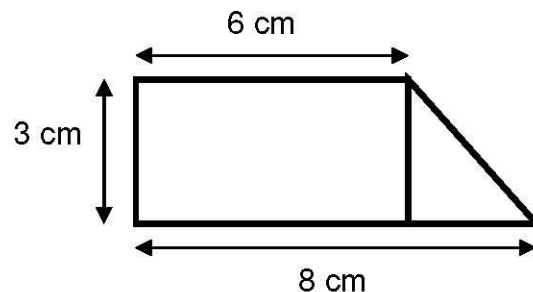
3 square centimetres =

3 centimetres squared =
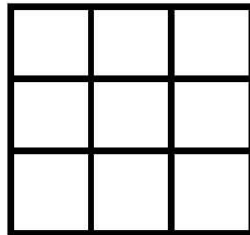
When working out areas of shapes it can be useful to split the shapes into simpler shapes such as rectangles and triangles.

Example: Find the area of the following shape.

6 cm

3 cm

8 cm

It is easier to split the shape into a rectangle and a triangle. If calculating the area in m^2 it is also useful to convert all distances into m before caclualting the area. The area of a rectangle is equal to its base multiplied by its height.

Rectangle = 0.06 x 0.03 = 0.0018 m^2

The area of a triangle is equal to half of its base multiplied by its height.

Triangle = ½ x 0.02 x 0.03 = 0.0003 m^2

area of triangle is half of area of a rectangle

The two areas are then added together

Area of rectangle =   0.0018
Area of triangle =   + 0.0003
Total area =   0.0021 cm^2
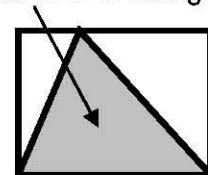
Additional resources on measurement

Worksheets, power points and videos on calculating areas and volumes of simple shapes.
http://www.highlandlearning.org.uk/maths/?id=02&index=0

Additional support for learning resources on measurement

Data Analysis

The data and analysis outcomes and experiences at levels 3 and 4 are currently being delivered by the following departments.

Having discussed the variety of ways and range of media used to present data, I can interpret and draw conclusions from the information displayed, recognising that the presentation may be misleading. **MNU 2-20a**

I have carried out investigations and surveys, devising and using a variety of methods to gather information and have worked with others to collate, organise and communicate the results in an appropriate way. **MNU 2-20b**

I can work collaboratively, making appropriate use of technology, to source information presented in a range of ways, interpret what it conveys and discuss whether I believe the information to be robust, vague or misleading. **MNU 3-20a**

I can evaluate and interpret raw and graphical data using a variety of methods, comment on relationships I observe within the data and communicate my findings to others. **MNU 4-20a**

Department	Outcome	Stage	Context
Maths	MNU 3.20a	S1	Analysis of databases, diagrams, graphs and statistical information.
	MNU 4.20a	S1-S2	Analysis of statistics.
Biology	MNU 4.20a	S1-S3	Analysis of graphs, cover both line and bar graphs from an early stage. Learners practice drawing graphs, interpreting/analysing graphs and describing relationships between factors using graphs.
Business Education	MNU 3.20a	S2-S3	Analysis of spreadsheets and graphs.
	MNU 4.20a	S4-S6	Analysis of spreadsheets and graphs.
Chemistry	MNU 4.20a	S1-S3	Evaluating graphs and drawing conclusions.
English and Media	MNU 3.20a	S2-S3	Discursive essay research, Persuasive Writing tasks.
	MNU 4.20a	S2-S3	Discursive essay research, Persuasive Writing tasks.
Geography	MNU 3.20a	S1-S3	Creating and interpreting graphs, Weather and countries.
	MNU 4.20a	S2-S3	Graphs for Earthquakes and volcanoes, Weather and countries, Conclusion Enquiry Skills, Support and Oppose Enquiry Skills.
History	MNU 3.20a	S1-S3	Evaluating historical sources.
	MNU 4.20a	S1-S3	Analysing source information, Witchcraft – executions and creating bar graphs.
ICT	MNU 4.20a	S1	Spreadsheet charting.
Modern Studies	MNU 3.20a	S1-S3	Democracy – Exaggeration Enquiry Skill, Conclusion Enquiry Skills.
	MNU 4.20a	S1-S3	Analysing and Interpreting graphical data.
PE	MNU 3.20a	S1-S3	Data gathering work with video analysis, iPads, methods of gathering data and statistical analysis of games.
	MNU 4.20a	S1-S3	Data gathering work with video analysis, iPads, methods of gathering data and statistical analysis of games.
Physics	MNU 3.20a	S1-S3	Analysis of data in wide variety of contexts, Space – researching Planetary Data using textbooks and selecting suitable internet sites, drawing from data and interpreting graphs to obtain values.
	MNU 4.20a	S1-S3	Analysis of graphical data, interpreting data from scatter graphs of voltage against current and thermistor resistance against temperature.
Pupil Support	MNU 3.20a	S1-S3	Learners learn in a variety of ways, using visual data/information is a method used to engage leaners in a range of their subjects as they find this the best way to understand tasks and information.
	MNU 4.20a	S1-S3	Learners learn in a variety of ways, using visual data/information is a method used to engage leaners in a range of their subjects as they find this the best way to understand tasks and information.
RMPS	MNU 3.20a	S1-S2	World religions – interpreting data from a map, Islam – work out the amount of money given to charity by Muslims and the impact of this.
	MNU 4.20a	S2	Islam – learners compare and contrast the number of Sunni and Shia Muslims.

Maths department support on data and analysis

Additional resources on data and analysis

Worksheets, power points and video lectures on the analysis of numerical data.
http://www.highlandlearning.org.uk/maths/?id=08&index=0

Additional support for learning resources on data and analysis

Ideas of chance and uncertainty

I can conduct simple experiments involving chance and communicate my predictions and findings using the vocabulary of probability. **MNU 2-22a**

I can find the probability of a simple event happening and explain why the consequences of the event, as well as its probability, should be considered when making choices. **MNU 3-22a**

By applying my understanding of probability, I can determine how many times I expect an event to occur, and use this information to make predictions, risk assessment, informed choices and decisions. **MNU 4-22a**

The ideas of chance and uncertainty outcomes and experiences at levels 3 and 4 are currently being delivered by the following departments.

Department	Outcome	Stage	Context
Maths	MNU 3.22a	S1-S2	Probability.
	MNU 4.22a	S1-S2	Probability.
Biology	MNU 4.22a	S2-S3	Genetics.
English and Media	MNU 3.22a	S1-S3	Plot – Imaginative writing.
Geography	MNU 3.22a	S2-S3	Earthquakes, Volcanos and Earthquakes.
	MNU 4.22a	S3	Weather patterns.
Health and Wellbeing	MNU 3.22a	S1-S3	Functional properties within Home Economics, HFT – experiments.
Physics	MNU 4.22a	S3	Radioactivity and decay probability.
RMPS	MNU 3.22a	S2	Braes Anatomy – looking at the probability of successful IVF.
Technologies	MNU 3.22a	S3	Computing Science – Python, Random function.
	MNU 4.22a	S3	Computing Science – Python, Random function.

Maths department support on ideas of chance and uncertainty

Additional resources on ideas of chance and uncertainty

Worksheets, power points and video lectures on probability.
http://www.highlandlearning.org.uk/maths/?id=09&index=0

Additional support for learning resources on ideas of chance and uncertainty