Progression and Support Document
Second Level – Pathway 2

Rationale

This series of Progression and Support documents, including Pathways and Bundling Advice provides a progression of skills through a level. Regular reinforcement of concepts and promotion of Numeracy Across Learning is encouraged. The Pathways are not intended to be prescriptive or restrictive. Practitioners should identify when opportunities occur within contexts across the curriculum and plan for this to demonstrate relevance. The overall aim is to provide a shared standard of expectations and to ensure progression and depth within planning.

The Progression and Support documents focus on the skills required to achieve concepts within an outcome and detail the mental agility strategies associated with the learning within each experience and outcome. Suggestions for formative assessment and summative assessment are provided and some possible resources are listed, but this list is by no means exhaustive.

It is hoped that these Progression and Support documents provide a clear framework and the necessary support so that practitioners can feel confident in planning engaging, well-paced and suitably challenging learning experiences, which involve a variety of methodologies. Ultimately our goal is to raise attainment for all our learners and these documents are just one part of that journey. All our learners should be given opportunities that will allow them to become confident and numerate, build their skills in a variety of contexts and allow them to reach their own targeted positive destinations.

Many of the documents consulted in the process of creating the Support and Progression documents can be found on the Education Scotland website. These include:

- Numeracy and Mathematics: Experiences and Outcomes
- Mathematics: Principles and Practice
- Numeracy Across Learning: Principles and Practice
- National Numeracy and Mathematics Progression Framework
- Numeracy and Mathematics Benchmarks
- CfE Statement for Practitioners

In addition to this, current planning documents that are being used across the authority, progression documents from other local authorities across Scotland and a variety of resources were consulted.

Renfrewshire Council
Numeracy and Mathematics Progression and Support - Second Level Pathway 2
Bundling Advice

There are many possible ways to bundle Numeracy and Mathematics Experiences and Outcomes depending on the skills that are being explored and the contexts for learning that are relevant to the children that the learning is being planned for.

The following is **one example** of how to bundle the Experiences and Outcomes according to the skills in this pathway. Choosing bundles of outcomes based on relevant contexts for learning is always the best practice and should be explored whenever possible. It can also be appropriate to bundle Numeracy and Mathematics across curricular areas if there is a clear opportunity to do so. There is exemplification of one of these bundles for further clarification and to demonstrate the learning opportunities that link these particular Experiences and Outcomes as a bundle in this instance.

These bundles can be approached in whichever order is most appropriate. Some of the Experiences and Outcomes have not been bundled as links between outcomes were too tenuous. Bundling without clear and strong links is not beneficial and it may be the case that some Experiences and Outcomes are better taught discretely.

There should be an element of number work/manipulating number every day, regardless of any other Numeracy and Mathematics learning that is planned for. This will provide regular opportunities to reinforce and challenge learning across the key numeracy outcomes which are indicated in **bold** below. At the beginning of a new pathway, the regular number work/manipulation of number will be based on reinforcement of the skills from the previous pathway. As the learning progresses, introduction of learning to develop the new skills within the current pathway should be introduced and progressed.

Bundling of Experiences and Outcomes Second Level Pathway 2	Opportunities across the curriculum
Estimation and rounding MNU 2-01a **Number and number processes MNU 2-03a** Money MNU 2- 09a & MNU 2-09b	
Number and number processes MNU 2-02a Expression and equations MTH 2-15a	
Multiples, factors & primes MTH 2-05a Mathematics – its impact on the world, past, present & future MTH 2-12a **Patterns & relationships MTH 2-13a**	
Properties of 2D shapes & 3D objects MTH 2-16a Properties of 2D shapes & 3D objects MTH 2-16b Angle, symmetry & transformation MTH 2-17a Angle, symmetry & transformation MTH 2-17b	
Angle, symmetry and transformation MTH 2-19a	
Measurement MNU 1-11a & MNU 2-11b (length, weight and volume & capacity) Properties of 2D shapes & and 3D objects MTH 2-16c Angle, symmetry and transformation MTH 2-17d	
Measurement MNU 2-11c Angle, symmetry & transformation MTH 2-17c Angle, symmetry & transformation MTH 2-18a	
Number and number processes MNU 2-03b **Fractions, decimal fractions and percentages MNU 2-07a, MNU 2-07b & MTH 2-07c**	
Time MNU 2 -10a & MNU 2-10b	
Data & analysis MNU 2-20a, MNU 2-20b & MTH 2-21a	
Ideas of chance and uncertainty MNU 2-22a	

As stated above, this is only one possible way to bundle the Experiences and Outcomes for this pathway. Different contexts for learning across the curriculum will raise opportunities to bundle in different ways. Consideration should be given to bundling in relevant contexts and to using opportunities across the curriculum to reinforce Numeracy and Mathematics skills.

Bundling within Numeracy and Mathematics

The following explains why these experiences and outcomes bundle sensibly.

Bundle	Reasons bundle was chosen
Properties of 2D shapes & 3D objects MTH 2-16a & MTH 2-16b Angle, symmetry & transformation MTH 2-17a & MTH 2-17b	Whilst exploring the properties of 2D shapes and 3D objects in **MTH 2-16a** and **MTH 2-16b**, angles within the shapes can be explored for **MTH 2-17a** which would be a natural connection to make anyway so there is no need to address these Es & Os separately. Additionally when drawing angles for **MTH 2-17b**, to check whether the angle seems to have been drawn correctly, knowledge of angle types from **MTH 2-17a** would be used to check the drawing. Exploration of angles in drawing particular shapes could be explored also. As stated previously, there are numerous ways to bundle the experiences and outcomes, this is only one way. If there is a particular context being explored in class, i.e. social studies, science etc., it may be sensible to bundle differently.

Bundling Across the Curriculum

The following is an example of bundling experiences and outcomes from across the curriculum, within a context.

Bundle and Context for Learning	Reasons bundle was chosen
Context is Science theme of 'The Solar System' By observing and researching features of our solar system, I can use simple models to communicate my understanding of size, scale, time and relative motion within it. **SCN 2-06a**	In order to explore physical features of the planets in the solar system, children could design 'Top Trump' style cards that detail a variety of comparable facts/properties of each of the planets such as size, temperature on surface, gravity etc. This produces a database of information. The information can be compared and organised and displayed in a variety of ways, also utilising technologies to do so. This incorporates skills from several different curricular areas including **Literacy, Science, Numeracy and Mathematics and Technologies**. The main Numeracy and Mathematics experiences and outcomes that could be included through this learning opportunity are: **MNU 2-01a, MNU 2-02a, MNU 2-03a/b, MNU 2-20a, MNU 2-20b, MTH 2-12a** Exploring scale in relation to the planets, the sun and the earth's moon. Use measuring and scaling skills to create a model or a diagram of the solar system **MNU 2-11a/b, MTH 2-16b, MTH 2-17c MTH 2-17d**. Skills within **MNU 2-03a** may also utilised. Create nets of 3D objects or construction materials to create a spacecraft. Explore the properties of the shapes. **MNU 2-03a, MTH 2-16a, MNU 2-11a/b** These are a few examples of how to plan for Numeracy and Mathematics across the curriculum by bundling relevant outcomes. As you can see, many of the discussion points would have taken place anyway. Considering the above experiences and outcomes together, extends the learning and utilises Numeracy and Mathematics in a meaningful way.

Second Level Progression and Support Pathway Two

Renfrewshire Council

Number and Number Processes	Number and Number Processes	Ideas of chance and uncertainty	Angle, symmetry and transformation	Angle, symmetry and transformation	Estimating and Rounding	Number and Number Processes	Time	Properties of 2D shapes & 3D objects
MNU 2-02a	MNU 2-03a Add & Subtract	MNU 2-22a	MTH 2-17a	MTH 2-17b	MNU 2-01a	MNU 2-03a Multiply &Divide	MNU 2-10a	MTH 2-16a

Patterns & Relationships	Expressions & Equations	Money	Angle, symmetry and transformation	Angle, symmetry and transformation	Mathematics – its impact on the world, past, present & future	Number and Number Processes	Fractions, decimal fractions & percentages	Properties of 2D shapes & 3D objects
MTH 2-13a	MTH 2-15a	MNU 2-09b	MTH 2-19a	MTH 2-18a	MTH 2-12a	MNU 2-03b	MNU 2-07a	MTH 2-16b

Measurement	Data & Analysis	Multiples, factors & primes	Fractions, decimal fractions & percentages	Angle, symmetry and transformation	Money	Measurement	Data & Analysis	Data & Analysis
MNU 2-11a MNU 2-11b Length	MNU 2-20b	MTH 2-05a	MTH 2-07c	MTH 2-17c	MNU 2-09a	MNU 2-11a MNU 2-11b Weight	MTH 2-21a	MNU 2-20a

Angle, symmetry and transformation	Measurement	Measurement	Properties of 2D shapes & 3D objects	Fractions, decimal fractions & percentages
MTH 2-17d	MNU 2-11c	MNU 2-11a MNU 2-11b Volume & Capacity	MTH 2-16c	MNU 2-07b

Please note that MTH 2-03c, MNU 2-04a, MNU 2-09c, MNU 2-10b and MNU 2-10c are omitted from this Pathway.

The above is an overview of the Experiences and Outcomes contained in Second Level Pathway 2. It is best practice to bundle together Es & Os for teaching and learning. This can happen within the curricular area of Numeracy and Mathematics or Numeracy and Mathematics Es & Os can be bundled with other curricular Es & Os. Some Es & Os may be taught in isolation if bundling is not appropriate with the particular contexts for learning that are being explored as tenuously bundled Es & Os are not advised as relevance and depth of learning would be weak. **Advice on bundling is included within this document.**

How to Use Progression and Support Documents to Support Planning

The following annotation explains how the Progression and Support Documents can be used to support planning.

The Experience and Outcome.

The benchmark(s) to be achieved by the **end** of the level.

Topic & CfE Outcome - Multiples, factors and primes

Having explored the patterns and relationships in multiplication and division, I can investigate and identify the multiples and factors of numbers. MTH 2-05a

Benchmarks

- Identifies multiples and factors of whole numbers and applies knowledge and understanding of these when solving relevant problems in number, money and measurement.

Mental Strategies	Skills	Possible Resources	Assessment
Recall Recite and recall all multiplication facts and corresponding division facts Recognise the link between 2, 4 and 8 times tables Recognise the link between 3, 6 and 9 times tables Recognise the link between 2, 5 and 10 times tables	I can use the term 'multiple' correctly I can recognise number patterns involving multiples of the 2 – 10 times tables, e.g. 2, 4, 6, 8… 5, 10, 15… • I can recite my 2, 4 and 8 times-tables • I can recall individual multiplication and division facts in my 2, 4 and 8 times-tables • I can recite my 5 and 10 times-tables • I can recall individual multiplication and division facts in my 5 and 10 times-table • I can recite my 3, 6 and 9 times-tables • I can recall individual multiplication and division facts in my 3, 6 and 9 times-tables • I can recite the 7 times-table • I can use the link between times-tables to help me recall my facts, e.g. doubling and halving • I can find the lowest common multiple of up to 3 numbers	HAM Teaching Cards MD 1.7a, MD 1.7b, MD 1.7c (Revision) TJ Level C Ch 13 Ex 2 pg 152 TJ 2a Ch 17 Ex 1 pgs 168 – 169 http://www.mathsisfun.com/numbers/math-trainer-multiply.html http://www.topmarks.co.uk/Flash.aspx?f=carrollv7	**Write** HAM Question Bank MD 1.7a, MD 1.7b & MD 1.7c **Do** Call out multiples of 2, 4 or 8 and, for each, ask children to write a times-tables fact with that answer on their mini-whiteboards. Discuss the different facts written for each number, e.g. 24 could be 3 × 8, 6 × 4, etc. Encourage children to explain how and why these facts are related. i.e. that multiplication is commutative. **Do** One child sits on a chair and the others line up facing the child's on the chair. Call out a multiple, e.g.24, the first to respond with a correct fact using the multiple wins the seat.

Mental strategies that are associated with the learning taking place in the Experience and Outcome.

This lists the skills that are to be achieved in this section of the Experience and Outcome. The **bold type** is the overall skills that should be developed and the bullet points are the skills broken down.

Some possible scheme based resources that could be used. This is not exhaustive. Best practice is to use a **Concrete – Pictorial – Abstract** approach that will involve a variety of resources and methodologies.

Suggested formative and summative assessments that could be used. Again, this is not exhaustive and assessment should take place when relevant and in the most appropriate style for the learner.

Renfrewshire Council
Numeracy and Mathematics Progression and Support - Second Level Pathway 2

Topic & CfE Outcome - Estimating 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**

Benchmarks
- Rounds whole numbers to the nearest 1000, 10 000 and 100 000.
- Rounds decimal fractions to the nearest whole number, to one decimal place and two decimal places.
- Applies knowledge of rounding to give an estimate to a calculation appropriate to the context.

Mental Strategies	Skills	Possible Resources	Assessment

Recall
Practise rounding to 1000 and 10 000 using real-life contexts
 	
Sums and differences of pairs of multiples of 10, 100 and 1000
 	
Numbers that can be added to any four digit number to make the next multiple of 1000, i.e.
4087 + ? = 5000
 	
Skills
(mentally, with jottings and materials if needed)
 	
Use rounding to estimate an answer to a calculation
 	
Partition – add or subtract a multiple of 10 or 100 and adjust, e.g.
  46 + 29
= 46 + 30 – 1
or
  86 – 38
= 86 – 40 + 2
	I can round a range of whole numbers to the nearest 1000, 10 000 and 100 000
	
	• I can round to the nearest 1000, 10 000, 100 000 by looking at the digits and can explain the rule I have used
	• I can use this to estimate an answer to a calculation, e.g. 2679 + 5923 will be roughly 3000 + 6000 = 9000 and, e.g. 38 723 + 59 213 will be roughly 40 000 + 60 000 = 100 000
	• I can explain the importance of looking at particular digits in a number when I am deciding how to round
	• I can give examples of numbers which are rounded to a multiple of 1000, 10 000 and 100 000
	• I have estimated, by rounding in different ways, and can compare this with the exact answer, discussing the accuracy of my estimate
	• I can give examples of when the accuracy of an answer is important in everyday contexts
		HAM Teaching Cards WN 2.13, WN 2.14
		
		TJ Level E Ch 1
		Ex 9
		Ex 10 pgs 21 – 22
		
		TJ 2b Ch 1
		Ex 3
		Ex 4 pgs 7 – 8
		
		H6 Teacher's Notes pgs 38 – 43
		
		H6 Tbk pgs 6 – 8
			Write
			HAM Question Bank WN 2.13, WN 2.14
			
			Write
			Give the children a number that has been rounded and ask the children to list the possible numbers that it has been rounded from, i.e. 'A number has been rounded to the nearest 1000, to 4000. What could the original number have been?'
			
			Do
			Explain that a number when rounded to the nearest 10 000 is 20 000. Discuss how many possibilities there are for the number. What about 26 000? Would this be 20 000 when rounded to the nearest 10 000? Do this as a 'Show Me' activity with whiteboards.
			
			Say
			Children to explain their strategy for rounding to a specified number, i.e. 'Can you explain your strategy for rounding 4579 to the nearest 1000?'

Renfrewshire Council
Numeracy and Mathematics Progression and Support - Second Level Pathway 2

Topic & CfE Outcome - 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**

Benchmarks
- Reads, writes and orders whole numbers to 1 000 000, starting from any number in the sequence.
- Explains the link between a digit, its place and its value for whole numbers to 1 000 000.
- Reads, writes and orders sets of decimal fractions to three decimal places.
- Explains the link between a digit, its place and its value for numbers to three decimal places.
- Partitions a wide range of whole numbers and decimal fractions to three decimal places, for example, 3·6 = 3 ones and 6 tenths = 36 tenths.

Mental Strategies	**Skills**	**Possible Resources**	**Assessment**

Recall
Recall pairs of decimal fractions that total 1, e.g. 0·4 + 0·6 = 1
 	
What must be added to a decimal with a units and tenths to make the next whole number? e.g. 7·2 + ? = 8
 	
Give alternative representations of a decimal to one place, e.g. 0·4, $\frac{4}{10}$, 4 tenths. (Mixed numbers may also be explored if appropriate)
 	
Count on or back in tenths
	For whole numbers to 1 000 000
	  • **Order**
	  • **Read**
	  • **Write (digits and words)**
	  • **Place Value**
	  • **Partition**
	
	I can use digits 0 – 9 in different combinations to show how 5 and 6 digit numbers are constructed
	
	I can identify, extend and predict number sequences involving up to 5 and 6 digit numbers
	
	• I can count on and back from any number
	• I can talk about the digits which make up a number and can work out what each digit represents
	• I can put a number into a place-value frame with the digits in the correct position
	• When I see a number written in digits, I can read it out correctly by working out the value of each digit in its position knowing zero is a placeholder
	• When I hear a number read out I can work out how to write the number in digits
	• I can use my knowledge of place value to partition a number
	• I can compare and order numbers
	
	Introduce hundredths as decimal notation
	
	  • **Order**
	  • **Read**
	  • **Write (digits and words)**
	  • **Place Value**
	  • **Partition**
	  • **I can round to one decimal place in a real life context**
	
	I can use digits 0 – 9 in different combinations to show how 4 numbers are constructed to 2 decimal places, using 0 as a place holder.
	
	I can identify, extend & predict number sequences involving numbers to 2 decimal places.
	
	I can identify, extend and predict number sequences involving numbers to a million
	
	• I know that a decimal fraction is a representation of part of a whole number
	• I can identify and write hundredths as fractions
	• I can change any hundredths fraction to a decimal fraction
	• I can talk about how many hundredths are in a tenth and partition hundredths into tenths and hundredths
		HAM Teaching Cards FDP 2.9a
		
		TJ Level D Ch 3
		Ex 1
		Ex 2 from Qu 5
		pgs 34 – 38
		
		TJ Level E Ch 2
		Ex 2 pg 29
		
		TJ 2a Ch 1
		Ex 1 pgs 6 – 7
		
		TJ 2a Ch 5
		Ex 1 from Qu 5
		Ex 2 pgs 38 – 43
		
		TJ 2b Ch 1
		Ex 1 pgs 3 – 4
		
		H6 Teacher's Notes pgs 98 – 103
		
		H6 Tbk pgs 42 – 44
		
		H6 Wbk pgs 10 – 11
		
		H6 Teacher's Notes pgs 31 – 34
		
		H6 Tbk pg 3
			Write
			HAM Question Bank FDP 2.9a
			
			Do
			Call out a decimal fraction. The child should respond with the matching number, e.g. 4·7 = four and 7 tenths. Play this as a team game by splitting the class into two sides and directing the teams. If a significant number of children in a team answer keep going, but if only some of the team answer, the other team gets a point. This could also be played as a whiteboard 'Show Me' task.
			
			Do
			Children are given a number that is to be made up to the next whole number, e.g. 4·3 is given and the children should answer with 0·7. This could be made into a pairing game too.

	• I can explain the importance of zero as a placeholder • I can identify the position of hundredths on a number line • I can change any mixed number with hundredths to a decimal • I can talk about how decimal fractions are used in everyday life		

Renfrewshire Council
Numeracy and Mathematics Progression and Support - Second Level Pathway 2

Topic & CfE Outcome - Numbers and Number Processes
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**

Benchmarks
- Adds and subtracts multiples of 10, 100 and 1000 to and from whole numbers and decimal fractions to two decimal places.
- Adds and subtracts whole numbers and decimal fractions to two decimal places, within the number range 0 to 1 000 000.

Mental Strategies	Skills	Possible Resources	Assessment
Recall Recall the sums and differences of pairs of multiples of 10, 100 and 1000 Recall the addition doubles of numbers from 1 to 100, e.g. 37 + 37, and the corresponding halves What must be added to any 3 digit number to make the next multiple of 100, e.g. 631 + ? = 700 **Skills** (mentally, with jottings and materials if needed) Add or subtract any pair of three digit numbers, including crossing the 10s and 100 boundary, e.g. 247 + 358 and 591 - 235 Add near doubles of three digit numbers, i.e. 128 + 127 Add or subtract a near multiple of 100 to any two or three digit number, e.g. 235 + 198 = 235 + 200 - 2 Add or subtract a near multiple of 10 with three digits to any two or three digit number, e.g. 351 + 229 = 351 + 230 - 1 Add or subtract 2 or	**Add and Subtract** **I can add and subtract 2 digit numbers to/from 3 digit numbers mentally** **Without a calculator, I can add and subtract 5 and 6 digit whole numbers in written form** **I have investigated vocabulary in order to determine which processes are needed to solve problems** • I can select the most appropriate method for calculating mentally, e.g. partitioning, chunking, number-line, counting on, counting back, friendly numbers, rounding and adjusting etc. • I can explain why I have selected a particular method • I can line up numbers in the correct columns in written form • I can show my working in ways that make sense to me and the reader	**Add and Subtract** HAM Teaching Cards WN 2.15c TJ Level D Ch 1 Ex 2 Ex 3 pgs 11 – 13 TJ 2 a Ch 2 Ex 2 Ex 3 pgs 8 – 10 H6 Teacher's Notes pgs 26 – 30 H6 Tbk pgs 1 – 2 http://www.mathsisfun.com/numbers/addition-column.html http://www.mathsisfun.com/numbers/subtraction-regrouping.html	**Write** HAM Question Bank WN 2.15c **Do** You need pairs of cards with totals of 1000, e.g. 376 and 624, 486 and 514. Give a card to each child and ask them to move around the room to find the person with the complement to 1000. Discuss the strategies used to count on to work out the digits of the matching number. **Say** On the board, write pairs of 3 digit numbers that have a total of 1000 or that have a total of 1010, 1100, 1110, etc. Tell the children that you have been writing pairs of numbers with a total of 1000 but have made some mistakes, e.g. 826 and 274, 352 and 758, 472 and 528. Ask children to identify the error and suggest why it might have occurred. Use errors that have occurred in the lesson where possible.

3 digit multiples of 10 e.g. 140 – 20, 120 + 150 and 470 – 280			
Find the difference between near multiples of 100 or 1000, with or without bridging, e.g. 597 - 302 = 597 - 300 - 2			
Find the difference between near multiples of 100 and 1000, with bridging, e.g. 6070 - 4097 = 6070 - 4000 - 100 + 3			
Partition: add hundreds, tens and ones separately, then recombine			
Partition: subtract hundreds then tens and then ones, e.g. subtracting 372 by subtracting 300 then 70 then 2			
Counting on and back in multiples			
Subtract by **counting on** to the larger number			
Subtract by **counting back** from the larger number			
Partition: add or subtract a multiple of 10 and adjust, e.g. 46 + 29 = 46 + 30 – 1 or 76 – 28 = 76 – 30 + 2			
Partition: double and adjust, e.g. to calculate 76 + 78, double 76 and add 2 or double 78 and subtract 2			
Use knowledge of			

place value to **partition** numbers for addition and subtraction, i.e.
244 + 127 =
200 + 100 + 40 + 20 + 7 + 4

Chunking - Add or subtract in chunks of **friendly numbers**, i.e.
660 + 43 =
660 + 40 + 3
An empty number line can be used to visualise this

Rounding and adjusting - in addition and subtraction round one of the numbers to the nearest 10 (can round to 100 too in some circumstances) then deal with the second number. Remember to adjust at the end, i.e.
340 + 18 =
340 + 20 - 2

Making Tens - Use knowledge of tens to help in calculations, i.e.
189 + 245, take 1 from 245 and add to 189 to **Make a Ten** makes,
190 + 244 = 434

Use knowledge of place value and related calculations, e.g.
130 + 150 = 280 by using
13 + 15 = 28

Topic & CfE Outcome - Number and Number Processes

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 continued**

Benchmarks

- Uses multiplication and division facts to the 10th multiplication table.
- Multiplies and divides whole numbers by multiples of 10, 100 and 1000.
- Multiplies and divides decimal fractions to two decimal places by 10, 100 and 1000.
- Multiplies whole numbers by two digit numbers.
- Multiplies decimal fractions to two decimal places by a single digit.
- Divides whole numbers and decimal fractions to two decimal places, by a single digit, including answers expressed as decimal fractions, for example, $43 \div 5 = 8.6$.

Mental Strategies	Skills	Possible Resources	Assessment
Recall Recite and recall all multiplication facts and corresponding division facts Recognise the link between 2, 4 and 8 times tables Recognise the link between 3, 6 and 9 times tables Recognise the link between 5 and 10 times tables Recall doubles of numbers 1 to 100, e.g. double 58 and corresponding halves Recall doubles of multiples of 10 and 1000 and corresponding halves Recall factor pairs for known multiplication facts **Skills** (mentally, with jottings and materials if needed) Find a remainder after dividing a two digit number by a single digit, i.e. $27 \div 4 = 6r3$ Multiply and divide whole numbers and decimal fractions by 10, 100 or 1000	**Multiply and Divide** **I can use multiplication facts from 2 – 10 times tables, mentally** **I can multiply and divide up to 5 and 6 digit numbers by a single digit in written form** **I can use notation of remainders correctly** **I have had opportunities to explore concrete materials and pictorial representations in relation to grouping and sharing, building the concepts of multiplying and dividing, i.e. arrays for multiplication** **I have investigated vocabulary in order to determine which processes are needed to solve problems** • I can select the most appropriate method for calculating mentally, e.g. rounding and adjusting, chunking etc. • I can explain why I have selected a particular method • I can line up numbers in the correct columns • I can show my working in ways that makes sense to me and the reader	**Multiply and Divide** TJ Level D Ch 1 Ex 6 Ex 7 Ex 8 pgs 17 – 20 TJ 2a Ch 3 Ex 1 Ex 2 Ex 3 Ex 4 Ex 5 pgs 20 – 26 H6 Teacher's Notes pgs 55 – 69 H6 Tbk pgs 13, 14, 15, 16, 20, 21, 22, 23, 24, 25 http://www.mathsisfun.com/numbers/division.html http://www.topmarks.co.uk/ - search multiplication http://www.topmarks.co.uk/ - search division	**Say** Choose a child to select two number cards in the range 2-10, e.g. 3 and 5. Challenge children to name the multiples that are common to both the 3 and 5 multiplication tables. Demonstrate if necessary. Repeat for different pairs of numbers.

Multiply pairs of multiples of 10, i.e. 60 x 30 and a multiple of 100 by a single digit number, i.e. 900 x 8			
Divide a multiple of 10 by a single digit number (whole number answers), i.e. 80 ÷ 4, 270 ÷ 3			

Important Reminder

* Do not teach that when multiplying by 10 "add a zero to the end" as is stated in some textbooks as this shortcut does not develop conceptual understanding of what happens when a number is multiplied by 10. Teach that when a number is multiplied by 10, the number becomes ten times larger so each digit moves one column to the left with zero being inserted into the now vacant ones column as a place holder if needed.

* Similarly, do not teach that when dividing by 10 "simply remove a zero" as stated in some textbooks as this shortcut does not develop conceptual understanding and can indeed cause greater confusion when the whole number being divided does not end in a zero or later in Second Level when decimals are being divided by 10. Teach that when a number is divided by 10, the number becomes ten times smaller so each digit moves one column to the right.

Apply similar methodology to teaching multiplication and division by 100 and 1000.

Topic & CfE Outcome - Numbers and Number Processes

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

Benchmarks

- Adds and subtracts multiples of 10, 100 and 1000 to and from whole numbers and decimal fractions to two decimal places.
- Adds and subtracts whole numbers and decimal fractions to two decimal places, within the number range 0 to 1 000 000. - Multiplies and divides decimal fractions to two decimal places by 10, 100 and 1000.
- Multiplies decimal fractions to two decimal places by a single digit.
- Divides whole numbers and decimal fractions to two decimal places, by a single digit, including answers expressed as decimal fractions, for example, 43 ÷ 5 = 8·6.

Mental Strategies	Skills	Possible Resources	Assessment
Recall Sums and differences of decimals, e.g. 6·5 + 2·7 and 7·8 - 1·3 Numbers which can be added to a decimal with units and tenths to make the next number, i.e. 7·2 + ? = 8 **Skills** (mentally, with jottings and materials if needed) Calculate doubles and halves of decimals Add or subtract any pairs of decimal fractions each with units and tenths, e.g. 5·7 + 2·5, 6·3 – 4·8 Use knowledge of place value and related calculations, e.g. 6·3 + 4·8 = 11·1 by using 63 + 48 = 111	**Tenths – without a calculator** **I can add and subtract decimals with at most 1 decimal place in written form, i.e. 237·3 + 713·6 = 950·9** **I can add and subtract multiples of 10, 100 and 1000 to and from whole numbers and decimal fractions to 1 decimal place** **I can multiply and divide decimals with at most 1 decimal place, by a single digit, in written form, i.e. 625·1 x 3 = 1875·3** **I can multiply and divide whole numbers and decimal fractions to 1 decimal place by 10** **Add and Subtract** • I can use what I know about adding and subtracting whole numbers to help me work with decimal fractions • I can partition decimals into wholes and tenths to add or subtract mentally • I can use doubles and near doubles to help me add and subtract mentally • I can use an empty number line to show my thinking when adding or subtracting decimals • I can round and adjust to add or subtract decimals • I can work out complements to the next whole number to help me add and subtract decimals • I can use written calculations to help me add and subtract decimals • I can add and subtract multiples of 10, 100 and 1000 to and from whole numbers and decimal fractions to 1 decimal place **Multiply and Divide** • I can explain how to multiply whole numbers by 10 • I can partition a number with decimals and multiply each part by 10 • I can multiply by 10 by moving the digits one place to the left • I can explain how to divide any whole number by 10 to give a remainder • I understand the remainder can also be divided by 10 and this is shown as a decimal • I can partition a decimal number and divide each part by 10 • I can explain the rule for dividing by 10 • I can divide by 10 by moving the digits one place to the right • I can explain how to apply my whole-number strategies to decimal numbers linking them to the value and position of each digit (e.g. 4 × 6 = 24, so 4 × 0·6 = 2·4) • I can use doubling and halving skills to multiply decimals by a single digit	**Add and Subtract** HAM Teaching Cards FDP 2.17a H5 Teacher's Notes pgs 122 – 130 H5 Tbk pgs 54 – 56 H5 Wbk pgs 14 – 15 H6 Teacher's Notes pgs 93 – 94 H6 Tbk pgs 36 – 38 **Multiply and Divide** HAM Teaching Cards FDP (2.12 & 2.13 X by 10 only) FDP 2.18a, FDP 2.19a H5 Teacher's Notes pgs 126 – 130 H5 Tbk pgs 57 – 60 H6 Teacher's Notes pgs 95 – 97 H6 Tbk pgs 39 – 41	**Write** HAM Question Bank FDP 2.12, FDP 2.13, FDP 2.17a, FDP 2.18a, FDP 2.19a **Write and Do** Write a selection of addition and subtraction calculations involving tenths on the board and make an error in one of them. Children work out which one is incorrect and write the correct answer on their whiteboard. Once children are familiar with the activity, they can prepare a selection for others to work out. **Do** Ask half the children to write a decimal fraction with tenths in it on their whiteboard, i.e. 23·3. Ask the other half of the children to write a single digit number on their board. Get the children to walk around the room then call out either multiply or divide. The children find the nearest person from the other half of the room, i.e. decimal fraction finds a single digit number and vice versa, The children work together to calculate the answer. Ask pairs to explain the strategy that they used to complete their calculation. **Say** Ask children to watch you as you do a O·t ÷ O division on the board. Explain that you will intentionally make some mistakes and ask children to put their thumb up when they see an incorrect answer. This will indicate who is ready to explain why an answer is wrong. Select a child to explain what is wrong and why and ask them to correct the error.

• I can partition and use the grid method to multiply decimals by a single digit • I can use the expanded formal written method to multiply decimals by a single digit • I can use the formal written method to multiply decimals by a single digit • I can explain how to apply my whole-number strategies to decimal numbers linking them to the value and position of each digit • I can use my halving skills to divide decimals • I can divide using the chunking method • I can divide using the expanded formal method • I can divide using the formal method • I can use multiplication to check my division calculations		

Topic & CfE Outcome - Multiples, factors and primes

Having explored the patterns and relationships in multiplication and division, I can investigate and identify the multiples and factors of numbers.
MTH 2-05a

Benchmarks

- Identifies multiples and factors of whole numbers and applies knowledge and understanding of these when solving relevant problems in number, money and measurement.

Mental Strategies	Skills	Possible Resources	Assessment
Recall Recite and recall all multiplication facts and their corresponding division facts Investigate the link between 2, 4 and 8 times tables Investigate the link between 3, 6 and 9 times tables Investigate the link between 5 and 10 times tables Factor pairs of a given number to 100, i.e. 25 - 1, 25 5, 5 Give multiples of a given number, i.e. Give the next 5 multiples of 3	**I am able to explain what the term 'multiple' means** **I am able to explain what the term 'factor' means** **I can calculate factor pairs** **I can create a set of multiples and find common multiples between tables** • I can explain how a number being odd or even helps me to work out what it is divisible by • I can use my halving skills to test if numbers are divisible by 4 and 8 • I can explain how the last digit can help me test if a number can be divided by 5 or 10 • I can work out the sum of the digits to test if it is divisible by 3 or 9 • I can explain what a multiple is and can create a series of multiples of a number • I can use my knowledge of multiplication and division to decide if a number is a multiple of a given number • I can compare multiples of different tables and find the common multiples • I can explain how to find the smallest common multiple of different numbers	HAM Teaching Cards WN 2.6, WN 2.8 TJ 2a Ch 17 Ex 1 Ex 2 pgs 168 – 170 H6 Teacher's Notes pgs 52 – 54, 62 – 63 H6 Tbk pgs 12, 19 Qu 3, 20 Qu 6	**Write** HAM Question Bank WN 2.6, WN 2.8 **Do** In an outdoor learning space, map out a large rectangular area. At each corner write a factor number, e.g. 2, 3, 4 and 5. Ask the children to move around the area then call out a multiple, i.e. 15. The children need to run and stand at a factor of that number, i.e. in this case they could run to 3 or 5. Use mistakes as a teaching opportunity. **Do** Organise the children into a circle. Say a multiple and pass the ball to a child, they must give a factor pair of the number. The child then becomes the teacher and passes the ball to another child and says a multiple.

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

Benchmarks

- Uses knowledge of equivalent forms of common fractions, decimal fractions and percentages, for example, $\frac{3}{4}$ = 0·75 = 75%, to solve problems.

- Calculates simple percentages of a quantity, and uses this knowledge to solve problems in everyday contexts, for example, calculates the sale price of an item with a discount of 15%.

- Calculates simple fractions of a quantity and uses this knowledge to solve problems, for example, find $\frac{3}{5}$ of 60.

Mental Strategies	Skills	Possible Resources	Assessment
Recall Relate the denominator to dividing by a number, e.g. to find $\frac{1}{2}$ of a quantity, divide by 2, to find $\frac{1}{5}$ of a quantity, divide by 5 and so on Practise all times tables to increase knowledge of factors, e.g. $\frac{1}{6}$ of 42 is easier to identify if the pupil can recognise 6 as a factor of 42 and use times table knowledge Order fractions with the same denominator using a number line Halve any even number to 200 Halve multiples of 10 and 100 e.g. half of 70 or half of 500 Odd and even numbers to 1000 Identify common percentages and the equivalent fractions that represent them 75% = $\frac{3}{4}$ 50% = $\frac{1}{2}$ 25% = $\frac{1}{4}$	**Fractions** **I have had opportunities to use materials and visual representations to support my learning** **I understand and can use and explain the terms numerator and denominator** **I can find unit and non-unit fractions of a whole number, $\frac{1}{2}$, $\frac{1}{4}$ $\frac{3}{4}$, $\frac{3}{8}$ etc.** •I know that to find a unit fraction of a number, I share it into equal parts and that this is the same as dividing • I know the denominator of the fraction is the number I divide by • I can use a unit fraction of a number to find non-unit fractions **Decimal Fractions** **I understand the equivalence of decimals and fractions to 2 decimal places** **I have explored hundredths as a fraction and have looked at the notation of this as a fraction, a decimal fraction and a percentage, i.e. $\frac{23}{100}$ = 0.23 = 23%** • I can write hundredths as a fraction and as a decimal fraction **Percentages** **I understand the concept that 100% is one whole** **I can explain the equivalence of common fractions, decimal fractions and percentages** • I can write hundredths as a fraction and as a decimal fraction • I know that a percentage is another way to show hundredths • I can look at a picture split into hundredths and discuss it using percentages for each section • I can change a decimal fraction into a percentage • I can change a simple fraction into a percentage • I understand that I can change a percentage to a fraction to help me calculate a percentage of any amount • I can recall percentages as simple fractions and vice versa • I can calculate and compare simple percentages of amounts using fractions to help me	HAM Teaching Cards FDP 2.8 TJ Level D Ch 11 Ex 1 Ex 3 Ex 4 pgs 128 – 129, 132 – 134 TJ 2a Ch 11 Ex 4 Ex 5 pgs 102 – 105 H6 Teacher's Notes pgs 83 – 84 H6 Tbk pg 34 H7 Teacher's Notes pgs 71 – 73 H7 Tbk pg 27 http://www.topmarks.co.uk/ - search fractions **Decimal Fractions** TJ level D Ch 3 Ex 1 Qu 5 – 13 pgs 34 – 35 Ex 2 Qu 4 – 6 pgs 37 – 38 TJ 2a Ex 1 Qu 5 – 16 pgs 38 – 39 Ex 2 Qu 2 – 4 pgs 42 – 43 http://www.topmarks.co.uk/ - search decimals **Percentages** HAM Teaching Cards FDP 2.14, FDP 2.15 TJ Level D Ch 13 Ex 1 Ex 2 pgs 143 – 145 TJ 2a Ch 12	**Write** HAM Question Bank FDP 2.8 **Say** Ask children to explain to a partner the strategy they would use to find a fraction of a number, using division and multiplication for a question such as $\frac{5}{9}$ of 27. Ask the partners to create a poster that explains how to complete the calculation. **Do** Call out pairs of questions for children to find fractions of numbers, e.g. $\frac{6}{7}$ of 42, $\frac{5}{9}$ of 63. Ask children to say which answer is larger and record it on whiteboards to reveal all at the same time. **Write** HAM Question Bank FDP 2.14, FDP 2.15 **Do** Organise the children into a circle and stand in the middle. Call out a decimal fraction, i.e. 0·4, and pass the ball to a child. They say the equivalent percentage, i.e. 40%, as they pass the ball back to you. Repeat, moving to the child to their right. Continue until you have gone round the whole circle. Children can then work in groups, taking turns to be the person in the middle. **Write** TJ Level D Ch 13 Topic in a Nutshell pg 147 **Write** TJ 2a Ch 12 The 3R's Q1-6 pg 112

$10\% = \dfrac{1}{10}$ **Skills** (mentally, with jottings and materials if needed) Find unit fractions of numbers and quantities, e.g. $\dfrac{1}{2}$ of 20, $\dfrac{1}{4}$ of 16 using known table facts Partitioning in multiplication - multiply the tens, multiply the units then add, i.e. 12 x 5 = (10 x 5) + (2 x 5) Divide by grouping and sharing Recall fraction and decimal fraction equivalents of one half, one quarter, tenths and hundredths, e.g. $\dfrac{7}{100}$ = 0·07 Find fractions of whole numbers or quantities, i.e. $\dfrac{2}{3}$ of 39 Find 50%, 25% or 10% of whole numbers or quantities, i.e. 25% of 20kg		Ex 1 pgs 107 – 109 H6 Teacher's Notes pgs 114 – 119 H6 Tbk pg 52 – 54	**Write** Write some percentages on the board, e.g. 50%, 20%, 10% and 20%. These are the result of a survey of children's favourite sports. 50% football, 20% hockey, 10% running, 20% basketball. Give different total numbers of children in the survey and ask the class to work out how many voted for which sport each time.

Topic & CfE Outcome - Fractions, decimal fractions and percentages
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**

Benchmarks
- Uses knowledge of equivalent forms of common fractions, decimal fractions and percentages, for example, $\frac{3}{4} = 0\cdot75 = 75\%$, to solve problems.
- Calculates simple fractions of a quantity and uses this knowledge to solve problems, for example, find $\frac{3}{5}$ of 60.

Mental Strategies	Skills	Possible Resources	Assessment
Recall Recite and recall all multiplication facts and corresponding division facts Use knowledge of multiplication facts to simplify fractions	**Fractions** **I can explain equivalence of fractions within context** **I can find simple equivalent fractions using diagrams/fraction boards/fraction cubes etc.** **I can explain simplification of fractions** • I can identify equal fractions in pictures and models • I can explain why two simple fractions are equal • I can use my knowledge of table facts and multiples to decide if fractions are equal • I can create a series of fractions which are equal using my knowledge of table facts and multiples • I can use my knowledge of factors to decide if a fraction can be simplified • I can simplify a fraction by dividing the numerator and denominator by a factor • I can look at a simplified fraction and decide if this is the simplest form • I can explain what simplest form means and why it is helpful • I can use my knowledge of mixed numbers and improper fractions to help me simplify fractions • I can check my answer using a multiplication calculation **Decimals** **I can explain equivalence of fractions within a context** **I can explain and create simple equivalence of decimals and fractions to 2 decimal places using money**	HAM Teaching Card FDP 2.5, FDP 2.6 TJ Level C Ch10 Ex 2 Qu 4 – 17 pgs 114 – 116 TJ Level D Ch 11 Ex 2 pgs 130 – 131 H6 Teacher's Notes pgs 79 – 82 H6 Tbk pgs 31 – 32	**Write** HAM Question Bank FDP 2.5, FDP 2.6 **Write** TJ Level C Ch10 Topic in a Nutshell **Write** Write a fraction on the board. Ask the children to find as many equivalent fractions for it as they can. Repeat, choosing different fractions. **Do and Say** Write three fractions on the board, two of which are in simplest form and one that is not. Ask the children to work out which one is not in its simplest form. Children show their answer and discuss how they worked it out.

Renfrewshire Council
Numeracy and Mathematics Progression and Support - Second Level Pathway 2

Topic & CfE Outcome - Fractions, decimal fractions and percentages
I have investigated how a set of equivalent fractions can be created, understanding the meaning of simplest form, and can apply my knowledge to compare and order the most commonly used fractions. **MTH 2-07c**

Benchmarks
- Creates equivalent fractions and uses this knowledge to put a set of most commonly used fractions in order.
- Expresses fractions in their simplest form.

Mental Strategies	Skills	Possible Resources	Assessment
Recall Recite and recall all multiplication facts and corresponding division facts and use these to simplify	**I can demonstrate the equivalence of fractions using concrete materials and pictorial representations that help me make sense of the problem, i.e. bar model etc.** **I can calculate equivalent fractions** **I have experienced simplifying fractions** • I can order unit fractions by comparing the denominators • I can order fractions which have the same denominator by comparing the numerators • I can decide if fractions need to be changed into equivalent fractions to help me compare them • I can use my knowledge of factors to choose a helpful common denominator • I can create equal fractions with a common denominator	HAM Teaching Cards FDP 2.7 TJ 1b Ch 16 Ex 2 Ex 3 pgs 188 – 190 TJ Level C Ch 10 Ex 2 Q4 – 17 pgs 114 – 116 TJ Level D Ch 11 Ex 2 Q7 – 9 pg 131 TJ 2a Ch 11 Ex 3 Qu 7 – 10 pg 101 Linked to work in MNU 2-07a & MNU 2-07b	**Write** HAM Question Bank FDP 2.7 **Write** TJ 2a Ch 11 The 3R's Q1 - 5 **Do** Give six or more children a fraction on a piece of card or ask them to write one on a mini-whiteboard. They arrange themselves so they are standing in order from smallest to largest. Other children check they are in the correct order by working out equivalent fractions with the same denominator.

Topic & CfE Outcome - Money

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

Benchmarks
- Carries out money calculations involving the four operations.
- Compares costs and determines affordability within a given budget.

Mental Strategies	Skills	Possible Resources	Assessment
<u>Recall</u> Rounding for estimating total costs Number bonds to 100 Counting on in 10s <u>Skills</u> (mentally, with jottings and materials if needed) Apply mental strategies and skills from **MNU 2-03a** in context of money	**I can compare prices of various items in various different shops/online stores in order to make an informed purchase** **I can work to a budget to buy certain items** **I can apply my mental agility strategies and the formal written method as appropriate to help with money calculations** • I can explain why budgeting is an important skill and what I or others might budget for • I can work out calculations for costs, totals and balances to help me to budget • I can talk about how and why I might save to be able to afford something • I can talk about when I might borrow money to be able to pay for something and how I would pay it back • I can compare the costs of items and work out which I can afford within different budgets • I can talk about why it is important for different people to have a budget and what this means • I can work out different calculations which people might have to do as part of their budget • I can talk about the different ways in which people save • I can talk about the different ways that people borrow money and how they plan to pay it back • I can compare the costs of items and work out which I can afford within different budgets	HAM Teaching Cards MF 2.5, MF 2.6 TJ 2a Ch 8 Ex 3 Ex 4 pgs 72 – 75 TJ 2b Ch 7 Ex 3 pg 68 TJ Level E Ch 4 Ex 1 pgs 49 – 52	<u>Write</u> HAM Question Bank MF 2.5, MF 2.6 <u>Do</u> Ask the children to look on specified websites to price a specific item/s. Children to find items then discuss with teacher which would be the most cost effective to purchase, i.e. One item is cheaper elsewhere but will it cost more in petrol, bus fare to go for item separately? Is it worth it? <u>Do</u> Give different scenarios of two people saving – children vote on who has saved more. Andrea saves 50p a week for 12 weeks and Jack saves £1·50 for 5 weeks. Who has saved more? They put up their hands to vote and then discuss how they worked it out. Repeat several times, including some examples where the amounts saved are the same. Discuss why saving different amounts may be appropriate in different circumstances.

Topic & CfE Outcome - Money
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**

Benchmarks
- Demonstrates understanding of the benefits and risks of using bank cards and digital technologies.

Mental Strategies	Skills	Possible Resources	Assessment
Recall Rounding for estimating total costs Number bonds to 100 Counting on in 10s **Skills** (mentally, with jottings and materials if needed) Apply mental strategies and skills from **MNU 2-03a** in context of money	**I have investigated interest rates of various bank/credit cards** **I know how to compare rates for buying goods and taking out cash** **I have investigated debt and how this can mount up - including payment methods**	TJ Budgeting (Finance unit) Available for free-download from TJ website	

Topic & CfE Outcome - Time

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

Benchmarks

- Reads and records time in both 12 hour and 24 hour notation and converts between the two.

- Knows the relationships between commonly used units of time and carries out simple conversion calculations, for example, changes $1\frac{3}{4}$ hours into minutes.

- Uses and interprets a range of electronic and paper-based timetables and calendars to plan events or activities and solve real life problems.

- Calculates durations of activities and events including situations bridging across several hours and parts of hours using both 12 hour clock and 24 hour notation.

Mental Strategies	Skills	Possible Resources	Assessment
Recall 1 hour = 60mins $\frac{3}{4}$ an hour = 45mins $\frac{1}{2}$ an hour = 30mins $\frac{1}{4}$ an hour = 15mins 12 o'clock after am is noon 12 o'clock after pm is midnight **Skills** (mentally, with jottings and materials if needed) Counting on and back in fives **Partition**: count on or back in minutes and hours, bridging through 60 (analogue and digital times) When calculating durations count on to the next hour, find the hours and add on the remaining minutes, e.g. from 10.25am to 12.10pm 10.25am ➔11.00am 35mins 11.00am ➔12.10pm 1hr 10m Duration is 1hr 45mins	I can calculate duration in hours and minutes **I can use 24 hour times and relate it to 12 hour times** **I can use time tables set out in both 12 and 24 hour clock times** • I know that there are 24 hours in a day split into two 12 hour cycles which gives us our am and pm times • I know that pm times can also be represented in 24 hour format • I can recognise and read any 24 hour clock time and convert it to its equivalent am or pm time • I can recognise and read any am or pm time and convert it to its equivalent 24 hour clock time • I can show any 24 hour clock time • I can sequence and order 24 hour clock times • I can give examples of different time calculations people do in order to organise their lives • I can work out how long an event will take if I know the start and finish times • If I know a start or finish time and how long an event will take I can work out the finish or start time • I have explored how to adapt my number calculation strategies when working with time and can convert between units when required	HAM Teaching Cards T 2.4, T 2.5 TJ Level D Ch 4 Ex 2 pgs 47 – 48 TJ 2a Ch 4 Ex 3 pgs 31 – 32 H6 Teacher's Notes pgs 190 – 198, 203 H6 Tbk pgs 85 – 90, 93 http://www.mathsisfun.com/time.html http://www.mathsisfun.com/measure/calendar-between.html http://www.topmarks.co.uk/ - search time	**Write** HAM Question Bank T 2.4, T 2.5 **Do** Ask the children to write a 12 hour time with am or pm on the front of their whiteboard and the corresponding 24 hour time on the back of the board. Get the children to walk around the room. When the music stops, the children join in a pair with the nearest person. The children then show each other one side of the board and the other child gives the opposite notation. They check their boards to see if the answer is correct. Repeat several times. You can then group the children and ask them to order the times from earliest to latest too. **Do** Split the class into groups. Give each group a page of a TV guide for one day. Children choose a channel and work together to find out the duration of each programme on that channel. They can use analogue clock faces, setting the start time of a programme and moving the hands round to the finishing time. They record each programme's title and duration. Discuss how they worked out the duration of each programme. Ask them to work out the difference between the longest programme and the shortest, totals of types of programmes, etc.

Topic & CfE Outcome - Measurement
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** and
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**

Benchmarks
- Uses the comparative size of familiar objects to make reasonable estimations of length, mass, area and capacity.
- Estimates to the nearest appropriate unit, then measures accurately: length, height and distance in millimetres (mm), centimetres (cm), metres (m) and kilometres (km); mass in grams (g) and kilograms (kg); and capacity in millilitres (ml) and litres (l).
- Converts between common units of measurement using decimal notation, for example, 550cm = 5·5m; 3·009kg = 3009g.
- Chooses the most appropriate measuring device for a given task and carries out the required calculation, recording results in the correct unit.
- Reads a variety of scales accurately.
- Shows awareness of imperial units used in everyday life, for example, miles or stones.

Mental Strategies	**Skills**	**Possible Resources**	**Assessment**
Recall 1 metre = 100cm $\frac{1}{2}$ metre = 50cm $\frac{1}{4}$ metre = 25cm $\frac{1}{10}$ metre = 10cm 10 millimetres = 1 cm 1 Kilometre = 1000 metres **Skills** (mentally, with jottings and materials if needed) When reading scales, work out the value of increments of the scale by reading two main points then count the number of intervals. Divide the amount between two main points by the number of intervals Doubling and halving for estimating sizes Rounding to the nearest 10 and 100 Multiplying and dividing by 100 and 1000	**I have investigated the size of familiar objects including heights of people, height of door, length of classroom etc.** **I can use this knowledge to estimate the sizes of a variety of objects** **Length** • **Work with kilometres and millimetres** • **I can use kilometre, metre, centimetre and millimetre in calculations** **I can select appropriate equipment to measure length in km and mm** **I can use the length of a ruler or metre stick to help me estimate the length of other items to the nearest $\frac{1}{10}$ of a metre** **I can use the vocabulary and metric units of length for metre (m) and centimetre (cm)** **I can choose and use suitable units to measure length, converting when appropriate, and present the answer as km** **I can compare an actual measurement to an estimate to establish if answer is sensible** • I can measure in metres, centimetres and metres • I have an understanding of the length of a kilometre • I can use the appropriate abbreviations for metres, centimetres and millimetres • I can read scales to the nearest millimetre • I can draw accurate diagrams in centimetres • I can use +, - and x to solve problems involving length • I can give examples of metric and imperial units of measurement for length **I can use the measurements of everyday items to help me estimate** **I can engage in discussion about how and why measurement is used in everyday life** **I can give examples of how and why we need to measure** **I can use appropriate vocabulary to talk about different kinds of measurement**	**Length** HAM Teaching Cards M 2.3a TJ Level C Ch 12 Ex 4 pg 142 TJ Level D Ch 14 Ex 1 Ex 2 Ex 3 pgs 148 – 153 TJ 2a Ch 13a Ex 1 Ex 2 pgs 113 – 118 H6 Teacher's Notes pgs 150 – 151 H6 Tbk pg 69	**Write** HAM Question Bank M 2.3a **Do** Measure several items and write their measurements on sticky notes. Show children the items and the measurements and have them guess which measurement matches which item. Confirm the matches and see how many they matched correctly. Children can then lead this challenge and choose the objects and write their measurements. This strategy can be used for length, weight and capacity/volume. You can extend this task by asking them to convert the measurements once they have been matched too. **Do** Ask each child to write a length in metres or centimetres using decimals on their whiteboard (e.g. 4·6 m or 5·7 cm). Get the children to walk around the room then call out 'Pair!' The children join with the nearest person and say each other's measurement in a different way. For example, 4·6 m would be 460 cm or 4 m and 60 cm; 5·7 cm would be 57 mm or 5 cm and 7 mm. Repeat with weight and volume. **Do** Measure and the write the lengths of several different items from around the learning environment onto post-it notes and place them in a box. The children work in pairs and select one of the measurements at a time and write it on their

	I can suggest suitable equipment for measuring items, e.g. ruler, measuring tape, metre stick, counting stick, trundle wheel etc. **I can discuss conversions between related units of measure – km and m, and cm and mm and write them using their abbreviations** **I can convert units of measure – km and mm** • I can convert metres to kilometres • I can convert kilometres to metres • I can convert metres to kilometres and metres • I can use the appropriate abbreviations for kilometres and metres • I can convert centimetres to millimetres • I can convert millimetres to centimetres • I can convert millimetres to centimetres and millimetres • I can use the appropriate abbreviations for centimetres and millimetres • I can use the vocabulary and metric units of length • I can give examples of imperial units of length, when they are used and have a sense of their size • I can choose a strategy for estimation that is appropriate for my task • I can choose and use suitable units to measure the lengths of items, converting when appropriate, and can present my answer		whiteboard then place the post-it back in the box. The children have to estimate which item matches the measurement then they measure to check, using the most appropriate measuring instruments from the selection provided. They note down the item so that they can take part in a discussion at the end of the lesson.

Topic & CfE Outcome - Measurement

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 and
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 continued

Benchmarks

- Uses the comparative size of familiar objects to make reasonable estimations of length, mass, area and capacity.
- Estimates to the nearest appropriate unit, then measures accurately: length, height and distance in millimetres (mm), centimetres (cm), metres (m) and kilometres (km); mass in grams (g) and kilograms (kg); and capacity in millilitres (ml) and litres (l).
- Converts between common units of measurement using decimal notation, for example, 550cm = 5·5m; 3·009kg = 3009g.
- Chooses the most appropriate measuring device for a given task and carries out the required calculation, recording results in the correct unit.
- Reads a variety of scales accurately.
- Shows awareness of imperial units used in everyday life, for example, miles or stones.

Mental Strategies	Skills	Possible Resources	Assessment

Recall
1 kg = 1000g
$\frac{1}{2}$ kg = 500g
$\frac{1}{4}$ kg = 250g
$\frac{1}{10}$ kg = 100g
 	
Skills
(mentally, with jottings and materials if needed)
 	
When reading scales, work out the value of increments of the scale by reading two main points then count the number of intervals. Divide the amount between two main points by the number of intervals
 	
Multiplying and dividing by 100 and 1000
	Weight
	  • **Use kilograms and grams in calculations**
	  • **I have investigated the relationship between kilograms and grams**
	
	I can choose and use suitable units to measure the weight of items, converting when appropriate and present answer to an appropriate degree of accuracy - $\frac{1}{10}$ kg
	
	I can select appropriate equipment to measure weight, e.g. pan balance, scale, digital scale
	
	I can read the scale on a measuring device to the nearest graduation. Where there is an intermediate graduation I can work out the value
	
	I can discuss conversions between related metric units and write them using their abbreviations
	
	• I can use the vocabulary and metric units of weight
	• I can give examples of imperial units of weight, when they are used and have a sense of their size
	• I can choose a strategy for estimation that is appropriate for my task
	• I can select and use appropriate equipment to measure the weights of different items considering how accurate I need to be
	• I can choose and use suitable units to measure the weights of items, converting when appropriate, and can present my answer
	• I can compare my measurement with my estimate to see if my answer was sensible
	• I can convert kilograms to grams
	• I can convert grams to kilograms
	• I can convert grams to kilograms and grams
		Weight
		HAM Teaching Cards M 2.3b
		
		TJ Level C Ch 15
		Ex 5 pgs 168 – 170
		
		TJ 2a Ch 13d
		Ex 1
		Ex 2 pgs 141 – 143
		
		H6 Teacher's Notes pgs 160 – 165
		
		H6 Tbk pgs 75 – 78
			Write
			HAM Question Bank M 2.3b
			
			Do
			Measure several items and write their measurements on sticky notes. Show children the items and the measurements and have them guess which measurement matches which item. Confirm the matches and see how many they matched correctly. Children can then lead this challenge and choose the objects and write their measurements. This strategy can be used for length, weight and capacity/volume.
			
			Do
			Set different contexts based around cooking which involve a range of number calculations and where children have to convert between units. 'I have a 1 kg bag of sugar; each cake needs 50 g of sugar, so how many cakes can I make?' Once you have given a few examples, ask children to make up their own questions for each other.
			
			Say and Do
			Ask each child to write down two weight conversions such as 2kg = 2000g or 450g = 5·4kg (deliberate mistakes are allowed). Children take turns to show their conversions to the group. The others use thumbs up or down to indicate correct and incorrect conversions. If incorrect, they give the correct conversion.

Topic & CfE Outcome - Measurement

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 and

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 continued

Benchmarks

- Uses the comparative size of familiar objects to make reasonable estimations of length, mass, area and capacity.
- Estimates to the nearest appropriate unit, then measures accurately: length, height and distance in millimetres (mm), centimetres (cm), metres (m) and kilometres (km); mass in grams (g) and kilograms (kg); and capacity in millilitres (ml) and litres (l).
- Converts between common units of measurement using decimal notation, for example, 550cm = 5·5m; 3·009kg = 3009g.
- Chooses the most appropriate measuring device for a given task and carries out the required calculation, recording results in the correct unit.
- Reads a variety of scales accurately.
- Shows awareness of imperial units used in everyday life, for example, miles or stones.

Mental Strategies	Skills	Possible Resources	Assessment
Recall 1 l = 1000ml $\frac{1}{2}$ l = 500ml $\frac{1}{4}$ l = 250ml $\frac{1}{10}$ l = 100ml **Skills** (mentally, with jottings and materials if needed) When reading scales, work out the value of increments of the scale by reading two main points then count the number of intervals. Divide the amount between two main points by the number of intervals Multiplying and dividing by 100 and 1000	**I can demonstrate that I have a sense of certain volumes, e.g. litre of water, and can use this to compare and estimate volume and capacity in terms of $\frac{1}{4}$, $\frac{1}{2}$ and $\frac{3}{4}$ of a litre and then to $\frac{1}{10}$ of a litre** **I can choose and use suitable units to measure capacity and volume, converting when appropriate, and present answer to an approximate degree of accuracy – ml, l and then $\frac{1}{10}$ of a litre** **I can select and use appropriate equipment to measure capacity and volume, e.g. measuring jug, measuring cylinder, syringe etc.** **I can read the scale on a measuring device to the nearest graduation. Where there is an intermediate graduation I can work out the value** **Volume** • **Use millilitres and litres** • **I can use litres and millilitres in simple calculations** • **I have investigated the relationship between litres and millilitres** • I have explored the similarities and differences between capacity and volume • I can use the vocabulary and metric units of capacity ml and l • I can give examples of imperial units of capacity, when they are used and have a sense of their size • I can choose a strategy for estimation that is appropriate for my task • I can select and use appropriate equipment to measure capacity and volume considering how accurate I need to be • I can choose and use suitable units to measure capacity and volume, converting when appropriate, and can present my answer • I can compare my measurement with my estimate to see if my answer was sensible • I can convert litres to millilitres • I can convert millilitres to litres • I can convert millilitres to litres and millilitres • I can use the appropriate abbreviations for litres and millilitres	**Volume** HAM Teaching Cards M 2.3c TJ Level C Ch 15 Ex 1 Ex 2 pgs 160 – 164 TJ 2a Ch 13c Ex 1 Ex 2 pgs 130 - 133 H6 Teacher's Notes pgs 180 – 182 H6 Tbk pgs 81 – 82	**Write** HAM Question Bank M 2.3c **Do** Measure several items and write their measurements on sticky notes. Show children the items and the measurements and have them guess which measurement matches which item. Confirm the matches and see how many they matched correctly. Children can then lead this challenge and choose the objects and write their measurements. This strategy can be used for length, weight and capacity/volume. **Do** Hold up a bottle or container with some liquid in it. Tell children the capacity of the container and they use this to help them estimate the volume of liquid. They write their estimates on their whiteboards and hold them up. Ask a few to justify their estimate. 'The capacity is 1 litre and it looks less than a quarter full'. Pour the water into a measuring jug and ask a child to read the scale to confirm the actual amount. Children compare their estimate to the answer to see how close they were. Repeat for different volumes and containers with different capacities.

Topic & CfE Outcome - Measurement

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

Benchmarks

- Calculates the perimeter of simple straight sided 2D shapes in millimetres (mm), centimetres (cm) and metres (m).
- Calculates the area of squares, rectangles and right-angled triangles in square millimetres (mm²), square centimetres (cm²) and square metres (m²).
- Calculates the volume of cubes and cuboids in cubic centimetres (cm³) and cubic metres (m³).
- Demonstrates understanding of the conservation of measurement, for example, draw three different rectangles each with an area of 24 cm².
- Draws squares and rectangles accurately with a given perimeter or area.

Mental Strategies	Skills	Possible Resources	Assessment
Recall A = l x b V = l x b x h Recite and recall all multiplication and division facts When given a total, give possible factor pairs that would make the amount, e.g. 24 = 12 x 2 or 6 x 4 or 24 x 1 and relate this to area Addition of several numbers and reordering numbers to make addition easier	**Perimeter** • **I can calculate the perimeter of shapes by adding lengths of sides** • **I can explain the difference between calculating perimeter and calculating area** • I can explain what is meant by perimeter and can give the units we use to measure it, i.e. cm • I can work out the perimeter of a compound shape based on squares and rectangles knowing whether I have to measure every side • I can work out the perimeter of a square or rectangle by adding the lengths of the sides • I can use my knowledge of the properties of squares and rectangles to work out perimeter knowing which sides I need to measure • I can find the area of a square or rectangle by counting the squares • I can find the area of a square or rectangle by using my knowledge of arrays and multiplication facts • Using my knowledge of how to work out the perimeter of a square and rectangle and my understanding of the properties of shapes, I can work out the perimeter of other regular shapes **Volume** • **I can calculate the volume of cubes and cuboids** • I know that volume means the amount of space an object takes up. • I know that a cubic centimetre is represented as cm³ and can apply this knowledge to other units of measure for volume, i.e. m³ (Cubed) • I can count cubes to find volume	**Perimeter** HAM Teaching Cards M 2.4a TJ Level D Ch 14 Ex 4 pgs 154 – 155 TJ 2a Ch 13a Ex 4 Qu 1 – 4 pg 119 H6 Teacher's Notes pgs 150 – 152 H6 Tbk pgs 69 – 70 **Volume** TJ Level C Ch 15 Ex 3 pgs 164 – 166 TJ 2a Ch 13c Ex 3 pgs 134 – 136 H5 Teacher's Notes pgs 186 – 188 H5 Tbk pgs 93 – 94 H6 Teacher's Notes pgs 183 – 185 H6 Tbk pgs 83 & 84 Qu 1 – 4 SHM 6 Tbk pg 90	**Write** HAM Question Bank M 2.4a **Do** Each child draws a square or rectangle on their whiteboard. They label the length and width of their drawing using whole centimetres. On the back they write the perimeter and area of their shape. Ask them to find a partner. The partner should work out the area and the perimeter based on the lengths provided by the other partner. They check and discuss the answers. This can also be used for compound shapes, volume of cubes and cuboids with children creating a cube or cuboid with building cubes. **Make** Children work as a group to create a top tips poster or leaflet to explain how to work out the area and perimeter of squares and rectangles. They include pictures, explanations and examples to help them. Their work can then be presented and/or displayed. **Make** Challenge children to draw as many different shapes as they can with an area of 6 cm². All the squares must join on at least one side. How many different shapes can they find? As an extension, allow half squares to increase the number of possibilities. **Make** Ask children to work in pairs and draw two squares or rectangles on cm squared paper. They cut them out and connect them in different ways to create different compound shapes with

			the same area. Each time they create a new shape they sketch it and work out and record its perimeter.

Renfrewshire Council
Numeracy and Mathematics Progression and Support - Second Level Pathway 2

Topic & CfE Outcome - Mathematics – its impact on the world, past, present and future
I have worked with others to explore, and present our findings on, how mathematics impacts on the world and the important part it has played in advances and inventions. **MTH 2-12a**

Benchmarks
- Researches and presents examples of the impact mathematics has in the world of life and work.
- Contributes to discussions and activities on the role of mathematics in the creation of important inventions, now and in the past.

Mental Strategies	Skills	Possible Resources	Assessment
<u>Skills</u> (with jottings and materials if needed) Apply mental strategies and skills from **MNU 2-03a** and **MNU 2-05a**	**I know that mathematics underpins scientific and technological progress** **I am developing an understanding about the needs of people and the important role mathematics plays in our everyday lives** **I know that statistics play an important role in changing minds and behaviour, i.e. Richard Doll's pioneering work connecting smoking with lung cancer** **I have studied some famous mathematicians** **I have looked at different number systems** • **Fibonacci sequence** • **Roman numerals** • **Egyptian** • **Arabic** • I can represent and record Fibonacci numbers • I can describe the rule and can continue the Fibonacci sequence • I have investigated where Fibonacci numbers occur	HAM Teaching Cards AT 2.7d TJ Level D Ch 15 Ex 2 Qu 9 & 10 pg 169 TJ 2a Ch 15 Ex 2 Qu 9 – 13 pg 157	<u>Write</u> HAM Question Bank AT 2.7d <u>Make</u> Children can make a fact sheet or poster to display all that they have learned about the number system they have investigated.

Topic & CfE Outcome - Patterns and relationships
Having explored more complex number sequences, including well-known named number patterns, I can explain the rule used to generate the sequence, and apply it to extend the pattern. **MTH 2-13a**

Benchmarks
- Explains and uses a rule to extend well known number sequences including square numbers, triangular numbers and Fibonacci sequence. - Applies knowledge of multiples, square numbers and triangular numbers to generate number patterns.

Mental Strategies	Skills	Possible Resources	Assessment
Recall Recall multiplication facts to 10 x 10 and the corresponding division facts Recall doubles of numbers 1 to 100 e.g. double 67, and corresponding halves e.g. half of 134 Recall doubles of multiples of 10 and 100 and corresponding halves e.g. double 240, double 700 and half of 80, half of 600 **Skills** (mentally, with jottings and materials if needed) Add or subtract any pair of two digit numbers, including crossing the 10s and 100 boundary, e.g. 87 + 18 and 82 – 35 Add or subtract 2 or 3 digit multiples of 10 e.g. 130 + 20, 120 – 30 and 470 – 280 Double any 2 digit number, e.g. double 39 Double any multiple of 10 or 100, e.g. double 230 and double 700 Halve any even number to 200	**I can describe rules and continue more complex sequences and patterns** • I can discuss a visual pattern and how it is created • I can continue and extend the visual pattern • I can translate a visual pattern into a number pattern • I can continue the number pattern, using the visual pattern to help me • I can continue the number pattern without the support of the visual pattern • I can describe the rule used to create the next terms	HAM Teaching Cards AT 2.6 TJ Level D Ch 15 Ex 1 Ex 2 Qu 1 – 8 pgs 164 – 168 TJ 2a Ch 15 Ex 2 Qu 1 – 8 pgs 155 – 157 H6 Teacher's Notes pgs 124 – 126 H6 Tbk pgs 55 – 56	**Write** HAM Question Bank AT 2.6 **Write** TJ Level D Ch 15 Topic in a Nutshell p171 **Write** TJ 2a The 3R's pg 159 Q1 - 6 **Say and Do** Give children a sequence of numbers and ask them to work as a group to build a model of what the related visual pattern might look like. They might choose to use straws, cubes, counters etc. Share their different ideas and approaches to this.

Topic & CfE Outcome - Expressions and Equations
I can apply my knowledge of number facts to solve problems where an unknown value is represented by a symbol or letter. **MTH 2-15a**

Benchmarks
- Solves simple algebraic equations with one variable, for example, a - 30 = 40 and 4b = 20.

Mental Strategies	Skills	Possible Resources	Assessment
Recall Know what 'greater than', 'less than', 'equal to' and 'not equal to' means and be able to give examples, i.e. '36 is greater than 15'. 'Tell me a number that is less than 21'. **Skills** (mentally, with jottings and materials if needed) Add or subtract a pair (or more) of numbers to demonstrate knowledge of equality, i.e. 23 + 3 = 18 + 8 Find the value of a missing number by applying **inverse operations -** ∆ + 24 = 38 38 - 24 = 14 ∆ = 14 Find the value of a missing number by applying **balancing -** ∆ + 24 = 38 ∆ + 24 -24 = 38 - 24 ∆ = 14	**Using basic addition and subtraction facts, I can replace a number in the calculation with a letter.** **I can explain the strategies used to solve an equation** **I can apply understanding of balance by adding, subtracting, multiplying or dividing to make both sides of an equation equal** **I can solve words problems by creating and solving equations** • I can compare both sides of an equation and check that they are equal • I can use symbols to represent equalities and inequalities • I can find values that make an equation balance • I can put in a range of values to make an inequality true • I can discuss how to solve missing-number calculations including different operations • I know that a letter or a symbol can be used to represent a missing number • I can use my number skills to work out the value of the unknown letter • I can apply my known facts or strategies to solve a simple equation • I can enter different values into a function machine and work out the output • I can look at the output of a function machine and work out the input • I can create and investigate my own two-step function machines • In word problem I can use a letter or symbol to represent an unknown number • I can decide which operations are relevant to solve a word problem	HAM Teaching Cards AT 2.4, AT 2.5, AT 2.8 TJ Level D Ch 7 Ex 1 pgs 75 – 77 TJ 2a Ch 10 Ex 1 Ex 2 pgs 88 – 93 http://nrich.maths.org/5714 http://www.mathsisfun.com/algebra/introduction.html	**Write** HAM Question Bank AT 2.4, AT 2.5, AT 2.8 **Write** TJ Level D Ch 7 Topic in a Nutshell pg 85 Q1 – 3 **Write** TJ 2a Ch 10 The 3R's pg 96 Q1 – 3 **Do** Give the children a pan balance to use to help them with the understanding of achieving balance on both sides of the equals sign. In one side put the statement with the missing value, i.e. 135 + ◆ then put the answer in the other side. Ask the children to find the missing value. **Say and Do** Write an equation on the board for children to solve, working individually or in pairs. Children show their answer using their number fans. Discuss the strategies they used to solve it. **Do** Children work in a group of three. Two people each represent one step of a two-step function machine and the third person chooses the input numbers. The first person works out what happens when the number passes through their step and then the next person does the same. After a few turns they swap roles.

Renfrewshire Council
Numeracy and Mathematics Progression and Support - Second Level Pathway 2

Topic & CfE Outcome - **Properties of 2D shapes and 3D objects**
Having explored a range of 3D objects and 2D shapes, I can use mathematical language to describe their properties, and through investigation can discuss where and why particular shapes are used in the environment. **MTH 2-16a**

Benchmarks
- Describes 3D objects and 2D shapes using specific vocabulary including regular, irregular, diagonal, radius, diameter and circumference. Applies this knowledge to demonstrate understanding of the relationship between 3D objects and their nets. - Identifies and describes 3D objects and 2D shapes within the environment and explains why their properties match their function. - Knows that the radius is half of the diameter.

Mental Strategies	Skills	Possible Resources	Assessment
	2D Shape **I can identify some shapes with more than 6 sides** **I can discuss edges, vertices, diagonals, sides and angles** **I can create and/or copy tiling** **I can identify and name scalene triangles** **I can use rigidity of triangles in model making** **I have extended my vocabulary of circles to radius, diameter and circumference** • I can identify pairs of parallel or perpendicular lines on a polygon • I can explain the difference between regular and irregular 2D shapes • I have explored the symmetrical properties of a wide range of regular and irregular polygons • I have explored where and why different polygons are used in the real world • I have investigated a range of ways to sort polygons including the properties of their sides and the sizes of their angles **3D Objects** **I have investigated more complex 3D shapes and can discuss the names of the shapes and their properties** • I can recognise a variety of polyhedra and talk about their properties • I have explored where and why cubes, cuboids and other polyhedra are used in the real world • I can visualise and make a net of a simple polyhedron • I can identify cubes, cuboids and other polyhedra from drawings • I have explored the cross-sections of cubes, cuboids and other prisms • I can recognise cones, spheres, hemispheres and cylinders and talk about their properties • I have explored where and why 3D objects with curved faces appear in the real world • I have explored whether I can make the net of a 3D object with a curved face • I can draw a representation of a cone or cylinder • I have explored the cross-sections of cones, spheres and cylinders	**2D Shape** HAM Teaching Cards SPM 2.6a TJ Level C Ch 8 Ex 3 Ex 4 pgs 94 – 98 TJ Level D Ch 10 Ex 5 pgs 124 – 125 TJ 2a Ch 9 Ex5 pgs 85 – 86 H6 Teacher's Notes pgs 212 – 222 H6 Tbk pgs 99 – 100 **3D Objects** HAM Teaching Cards SPM 2.7a, SPM 2.7b TJ Level C Ch 14 Ex 1 pg 154 – 156 TJ 2a Ch 16 The R's pg 167 http://www.mathsisfun.com/geometry/common-3d-shapes.html http://www.topmarks.co.uk/ - search 3D	**Write** HAM Question Bank SPM 2.6a, SPM 2.7a, SPM 2.7b **Write** TJ Level C Ch 8 Topic in a Nutshell pg 99 Qu 9 – 10 **Make** Children to create a poster that explains the properties of different triangle types. **Do** Ask children to draw a shape on a piece of triangular dotty paper. Collect their shapes and shuffle them. Children take turns in the hot seat. They take a shape at random and describe the shape as completely as possible. Ask the rest of the group if they can add any further mathematical information. **Do** Show some pictures of 3D objects. In turn ask children to write the name of the object and to draw beside it the 2D shape that would be its cross-section. For example, cuboid – rectangle or square (depending on where cross-section is taken on cuboid). Discuss the answers with children. Let the children use play-doh and dental floss for cutting to experience this concretely.

Topic & CfE Outcome - Properties of 2D shapes and 3D objects
Through practical activities, I can show my understanding of the relationship between 3D objects and their nets. **MTH 2-16b**

Benchmarks
- Describes 3D objects and 2D shapes using specific vocabulary including regular, irregular, diagonal, radius, diameter and circumference. Applies this knowledge to demonstrate understanding of the relationship between 3D objects and their nets. - Identifies and describes 3D objects and 2D shapes within the environment and explains why their properties match their function. - Knows that the radius is half of the diameter.

Mental Strategies	Skills	Possible Resources	Assessment
	I can recognise nets of common shapes **I have investigated nets of cubes and cuboids** **I can make models of cubes and cuboids with given nets** • I can visualise a net of a simple polyhedron • I can look at a 3D object and visualise the net that is made from - cube, cuboid, triangular prism, square based pyramid, triangle based pyramid • I can make a 'skeleton' shape to match a given 3D object • I can take apart a hollow 3D object to create its net	H5 Teacher's Notes pgs 209 – 213 H5 Tbk pgs 99 – 101	<u>Do</u> Show children a 3D object and ask them to draw or write down the 2D shapes that are needed to create a net of the shape. Let children investigate this further by trying to make nets of their own. Discuss nets that worked and ones that did not. Provide the children with appropriate shape templates for this task.

Topic & CfE Outcome - Properties of 2D shapes and 3D objects

I can draw 2D shapes and make representations of 3D objects using an appropriate range of methods and efficient use of resources.

MTH 2-16c

Benchmarks

- Uses digital technologies and mathematical instruments to draw 2D shapes and make representations of 3D objects, understanding that not all parts of the 3D object can be seen.
- Knows that the radius is half of the diameter.

Mental Strategies	Skills	Possible Resources	Assessment
Skills (mentally, with jottings and materials if needed) Halving and doubling for radii and diameters	**I can use a set of compasses to draw circles** **I can make 3D models of shapes using a variety of materials, i.e. straws, technology kits** • I can talk about some of the properties of circles, semi-circles and ellipses • I have explored where and why circles, semi-circles and ellipses are used in the real world • I have explored the symmetrical properties of circles, semi-circles and ellipses • I can draw circles and semi-circles using a range of equipment • I can measure the circumference, diameter and radius of a circle • I can line up the point of the compass at 0cm on the ruler and careful extend the compasses to the appropriate length • I am careful not to move the compasses once they are set	HAM Teaching Card SPM2.6b TJ Level E Ch 19 Ex 1 Qu 1 – 6 pg 228 TJ 2a Ch 9 Ex 5 pgs 85 – 86 Linked with work in MTH 2-16a	**Write** HAM Question Bank SPM 2.6b **Do** Give the children a diameter for a circle that they are to draw with their compasses. They should know to half this number to get the radius, set their compasses to the size of the radius and take care to check the diameter with a ruler after they have drawn it. **Do** Ask the children to make statements about circles, semi-circles and ellipses which are either true or false. Write three headings on the board. Get the children to swap their statements with a friend and get them to decide which are true and which are false. Have a class discussion about any statements that have caused difficulty.

Renfrewshire Council
Numeracy and Mathematics Progression and Support - Second Level Pathway 2

Topic & CfE Outcome - Angle, symmetry and transformation
I have investigated angles in the environment, and can discuss, describe and classify angles using appropriate mathematical vocabulary.
MTH 2-17a

Benchmarks
- Uses mathematical language including acute, obtuse, straight and reflex to describe and classify a range of angles identified within shapes in the environment.

Mental Strategies	Skills	Possible Resources	Assessment
<u>Recall</u> Acute 1˚ - 89˚ Right 90˚ Obtuse 91˚ - 179˚ Right 180˚ Reflex 181˚ - 259˚ Full Turn 360˚	**I can identify a right angle and know it is equal to 90˚** **I can identify a straight angle and know it is equal to 180˚** **I can identify an acute angle as being smaller than a right angle** **I can identify an obtuse angle as being larger than a right angle but smaller than a straight angle** **I can identify a reflex angle as being larger than a straight angle** **I can identify that a full turn is the same as 360˚** **I have investigated the above angles in the environment**	TJ Level D Ch 8 Ex 1 pgs 87 – 88 H6 Teacher's Notes pgs 240 – 242 H6 Tbk pg 109 Qu 1 & pg 110 Qu 4 (Wbk needed for some parts) http://www.mathsisfun.com/geometry/straight-angle.html http://www.mathsisfun.com/angle180.html	<u>Write</u> TJ Level D Ch 8 Topic in a Nutshell pg 103 Q1-2 <u>Do</u> Randomly call out the terms acute, right, obtuse, reflex and straight angle; children use their angle maker to make the angle. <u>Do</u> Children draw around templates of 2D Shapes. They write the number of each type of internal angles, e.g. square has 4 right angles.

Topic & CfE Outcome - Angle, symmetry and transformation
I can accurately measure and draw angles using appropriate equipment, applying my skills to problems in context. **MTH 2-17b**

Benchmarks
- Measures and draws a range of angles to within ± 2°
- Knows that complementary angles add up to 90° and supplementary angles add up to 180° and uses this knowledge to calculate missing angles.

Mental Strategies	Skills	Possible Resources	Assessment
Skills (mentally, with jottings and materials if needed) Add any pair of numbers, including crossing the 10s and 100 boundary, e.g. 57 + 48 Add 2 or 3 digit multiples of 10, e.g. 70 + 110	**I can name angles using three letters** **I can measure angles to 180˚ accurately within 5 degrees** **I can draw angles to 180˚ accurately within 5 degrees** • I can use my knowledge of right angles to estimate the size of an angle • I can demonstrate how to use a protractor to measure angles up to 180° • I can demonstrate how to use a protractor to measure angles up to 360° • When I know the size of an angle I can work out the size of its complementary angle • I can use a protractor to measure the angles within 2D shapes	HAM Teaching Cards SPM 2.5b TJ Level D Ch 8 Ex 2 Ex 3 Ex 4 Qu 1 – 4 pgs 88 – 92 TJ 2a Ch 6 Ex 2 Ex 3 Ex 4 Qu 1 – 3- pgs 53 – 57 H6 Teacher's Notes pgs 240 – 242 H6 Tbk pg 109 Qu 2, 3 & pg 110 Qu 2, 3, 4 http://www.mathsisfun.com/geometry/degrees.html	**Write** HAM Question Bank SPM 2.5b **Write** TJ Level D Ch 8 Topic in a Nutshell pg 103 Q3-5 **Write** TJ 2a Ch 6 P60 The 3R's pg 60 Q3-5 **Make and Do** Children work in pairs. Each child draws an angle by drawing two connecting lines and adding the angle mark. Partners swap angles and estimate and measure each other's angle, recording both beside it. They repeat this until they have each drawn four angles. Ask them to cut out their angles. Each pair then orders their angles from smallest to largest; alternatively the group or the whole class could combine angles and put them in order.

Renfrewshire Council
Numeracy and Mathematics Progression and Support - Second Level Pathway 2

Topic & CfE Outcome - Angle, symmetry and transformation
Through practical activities which include the use of technology, I have developed my understanding of the link between compass points and angles and can describe, follow and record directions, routes and journeys using appropriate vocabulary. **MTH 2-17c**

Benchmarks
- Uses knowledge of the link between the eight compass points and angles to describe, follow and record directions.

Mental Strategies	Skills	Possible Resources	Assessment
<u>Recall</u> Size of angle from one main compass point to the next is 90˚ and I can use this knowledge to work out differences between any two given compass points	**I can recognise the eight compass points** **I have investigated the size of the angles between the eight compass points** **I can create and describe simple pathways. I can use this information to make the pathways with technologies, i.e. computers packages, roamer or beebot** • I can use a compass to find north and use this to find the other seven compass points (S, W, E, NE, NW, SE, SW) • I can relate compass points to fractions and angles • I can use my knowledge of angles and rotation to work out what compass point I will be facing after a particular turn or series of turns • I can use my knowledge of compass points to give, follow and record directions for journeys using a wide range of language	HAM Teaching Cards SPM 2.3 TJ Level D Ch 8 Ex 8 pgs 98 – 99 TJ 2a Ch 6 Ex 5 pg 58 – 59 H6 Teacher's Notes pgs 238 – 239 H6 Tbk pg 108	<u>Write</u> HAM Question Bank SPM 2.3 <u>Write</u> TJ 2a The 3R's pgs 61 Q6 - 8 <u>Do</u> Give children a direction and a number of degrees to turn either clockwise or anticlockwise – they try to work out the direction they will face after the turn. • Face south-east and turn 135° anticlockwise. • I am facing north and turn 180° clockwise. How many more degrees do I have to turn to face north-west? • I have turned from east to south-west. How many degrees have I turned? <u>Do</u> Ask each child to prepare a question along the lines of, 'I started facing north-west, but now I am now facing south. How did I get there?' Allow the children to work this out in their own way, i.e. drawing a picture, physically turning themselves to act it out.

Topic & CfE Outcome - Angle, symmetry and transformation			
Having investigated where, why and how scale is used and expressed, I can apply my understanding to interpret simple models, maps and plans. **MTH 2-17d**			

Benchmarks			
- Interprets maps, models or plans with simple scales, for example, 1 cm:2 km.			

Mental Strategies	Skills	Possible Resources	Assessment
Recall Recite and recall all multiplication and division facts	**I have used simple scale to find the true size of an item.** **I can give examples of where scaling would be useful, i.e. maps** **I can convert simple scales 1:2, 1:10, 1:5**	TJ 2a Ch 6 Ex 1 pg 52 – 54 H6 Teacher's Notes pgs 152 – 154 H6 Tbk pgs 71 – 72	**Do** Children measure a given item, rounding its length to the nearest whole number. They scale it to a given size.

Topic & CfE Outcome - Angle, symmetry and transformation
I can use my knowledge of the coordinate system to plot and describe the location of a point on a grid. **MTH 2-18a**

Benchmarks
- Describes, plots and records the location of a point, in the first quadrant, using coordinate notation.

Mental Strategies	Skills	Possible Resources	Assessment
Recall The horizontal location point is noted before the vertical point	**I can plot and identify points using coordinates.** **I know that the horizontal coordinate is written before the vertical coordinate.** • I can draw and label axes correctly, using appropriate language • I can use coordinates to locate a point on a grid • I can use coordinates to describe and locate a unique point on a grid • I can plot coordinates on a grid and connect them to complete a 2D shape • I can make journeys on a grid, following instructions about the coordinates to visit • I can use knowledge of shape to complete shapes on coordinate axes given some of the points • I can plot points and join them to create different pictures	HAM Teaching Cards SPM 2.4 TJ Level D Ch 12 Ex 1 Ex 2 Ex 3 pgs 136 – 141 TJ 2a Ch 14 Ex 2 pgs 147 – 149 H6 Teacher's Notes pgs 207 – 209 H6 Tbk pg 94 H7 Teacher's Notes pgs 122 – 123 H7 Tbk pg 56 (Wbk pg 12) TJ 2b Ch 15 Consolidation of Coordinates pg 142	**Write** HAM Question Banks SPM 2.4 **Write** TJ Level D Ch 12 Topic in a Nutshell pg 142 **Write** TJ 2a Ch 14 The 3R's pg 151 **Write** TJ Assessment Pack MTH 2-18a **Do** Provide the children with a coordinate grid each. Call out the coordinates of the corners of a particular shape or letter and children plot the points and cover them with counters. When complete, ask them to name the letter or shape (either call out its name or write it on a whiteboard and show). Repeat for different shapes or letters. Extend by giving them some of the coordinates and the name of the shape and they work out the missing coordinates.

41

Topic & CfE Outcome - Angle, symmetry and transformation

I can illustrate the lines of symmetry for a range of 2D shapes and apply my understanding to create and complete symmetrical pictures and patterns. **MTH 2-19a**

Benchmarks

- Identifies and illustrates line symmetry on a wide range of 2D shapes and applies this understanding to complete a range of symmetrical patterns, with and without the use of digital technologies.

Mental Strategies	Skills	Possible Resources	Assessment
	I can identify whether or not a shape has symmetry. **I can create or complete a symmetrical pattern on squared paper using increasingly more complex shapes and patterns (2 lines of symmetry)** • I can use the strategy of folding to check that I have matched a shape correctly on both sides • I can complete a tessellation of more advanced shapes to create a design and talk about my results	TJ Level C Ch 2 Ex 2 pgs 23 – 24 TJ Level D Ch 2 Ex 2 Q1, 2, 6, 7 pgs 29 – 31 TJ 2a Ch 12 Ex 2 Q1, 2 (a) – (h), (l), 3, 4 pgs 17 - 18 H5 Teacher's Notes pgs 198 – 200 H5 Tbk pg 95 – 96 H6 Teacher's Notes pgs 212 – 215 H6 Tbk pg 96 Qu 1 – 3 http://nrich.maths.org/1886	<u>**Write**</u> TJ Level C Ch 2 Topic in a Nutshell pg 25 <u>**Write**</u> TJ Level D Ch 2 Topic in a Nutshell pg 32 Q1 - 3 <u>**Write**</u> TJ 2a Ch 2 (miss out Q4c) The 3R's pg 19 <u>**Do**</u> Children draw half or quarter (depending on the number of lines of symmetry desired) of a shape on squared paper. They pass the design to another child to complete. Discuss finished designs as a class.

Renfrewshire Council
Numeracy and Mathematics Progression and Support - Second Level Pathway 2

Topic & CfE Outcome - Data and analysis

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**

Benchmarks
- Analyses, interprets and draws conclusions from a variety of data.
- Draws conclusions about the reliability of data taking into account, for example, the author, the audience, the scale and sample size used.

Mental Strategies	Skills	Possible Resources	Assessment
Recall Vocabulary of 'more than', 'less than', 'in total', 'altogether' etc. to help with understanding of questions If the top of a bar/line lies between two points on a scale, the interval will be a half, i.e. the bar's top is in the middle of 24 and 26 so the reading will be 25 **Skills** (mentally, with jottings and materials if needed) Use addition and subtraction skills for analysing data, i.e. 'How many more children like strawberry ice cream than vanilla?' 'If 4 children walked to school, 7 children cycled and 3 got the school bus, how many children were there altogether?' Skip counting for the scale of an axis	**Interpret** **I can take information from a table, graph, spreadsheet or database** **I can communicate my findings** • I can talk about how line graphs are useful in recording measurements over time • I can discuss the features of a line graph and find out information from it • I understand and can talk about the difference between discrete and continuous data • When making a line graph, I can choose an appropriate scale for both axes and plot measurements • I have explored how joining the points of measurement allows me to talk about what might be happening between them	TJ Level C Ch 6 Ex 2 Ex 3 Ex 4 pgs 72 – 78 TJ 2a Ch 18 Ex 1 Qu 7 – 13 pgs 175 – 177 H6 Teacher's Notes pgs 254 – 258 H6 Tbk pgs 111 – 114	**Make** Provide the children with a table of data which could be represented in a line graph (e.g. changes in height of a plant or person, temperature over hours, etc.). Children work in small groups to plot this information on a blank line graph template, and then join the points using straight lines to create a line graph. The context of the data should be relevant to the children, i.e. savings, school dinner uptake over a week etc.

Topic & CfE Outcome - Data and analysis
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**

Benchmarks
- Devises ways of collecting data in the most suitable way for the given task. - Collects, organises and displays data accurately in a variety of ways including through the use of digital technologies, for example, creating surveys, tables, bar graphs, line graphs, frequency tables, simple pie charts and spreadsheets.

Mental Strategies	Skills	Possible Resources	Assessment
Recall Vocabulary of 'more than', 'less than', 'in total', 'altogether' etc. to help with understanding of questions If the top of a bar/line lies between two points on a scale, the interval will be a half, i.e. the bar's top is in the middle of 24 and 26 so the reading will be 25 **Skills** (mentally, with jottings and materials if needed) Use addition and subtraction skills for analysing data, i.e. 'How many more children like strawberry ice cream than vanilla?' 'If 4 children walked to school, 7 children cycled and 3 got the school bus, how many children were there altogether?' Skip counting for the scale of an axis	**I can use a database to gather, filter and sort information** **I can use spreadsheets to gather, filter and sort information** **I can explore and design questionnaires to help answer questions ad solve problems** • I can work out what information I need to solve a problem or answer a question • I can discuss and decide on the most useful questions to ask to obtain the information I need • I can decide on the answer options I offer in order to obtain the best results • I can think about who and how many people I need to ask to obtain the answers I need • Having started my survey, I can decide whether I need to refine my questionnaire in order to obtain the best results • I can conduct my survey, collate my results, make sense of the information I have gathered and decide what to do next • I have explored how databases hold information, who might use them and can talk about when they are useful • I can create my own database and decide the fields of information it needs • I understand the need to be systematic when gathering information in order that my database is complete • I can filter and sort the information held in a database to find out what I want to know	HAM Teaching Cards IH 2.5, IH 2.6 TJ Level C Ch 6 Ex 1 pgs 69 – 71 TJ Level D Ch 5 Ex 1 Q1 – 4 pgs 52 – 53 TJ 2a Ch 18 Ex 5 pg 185 H6 Teacher's Notes pgs 258 – 260, 263 – 268 H6 Tbk pgs 115, 119 – 122	**Write** HAM Question Bank IH 2.5, IH 2.6 **Write** TJ Level C Ch 6 Topic in a Nutshell **Say and Do** Ask children a question. 'Do you have blonde hair?' 'Do you have two brothers?' They stand up if their answer is Yes and stay sitting down if their answer is No. Each time, discuss how many are standing or sitting, how many more are standing than sitting, etc. After each question, discuss how you would change this question if you were including it in a questionnaire. Would you ask 'What is your hair colour?' and give options to tick? Would you ask 'How many brothers do you have?' with a box to write the response in? Encourage children to think about the range of responses they might get and how the layout could anticipate this. **Do** Set up a database with fields for facts about children. Children take turns to add their record with responses for each field. Then use the database to perform different searches and discuss the results. The children could create 'Top Trump' style cards about themselves with pre-agreed criteria from this information to turn it into a game.

Topic & CfE Outcome - Data and analysis			
I can display data in a clear way using a suitable scale, by choosing appropriately from an extended range of tables, charts, diagrams and graphs, making effective use of technology. **MTH 2-21a**			

Benchmarks			
- Displays data appropriately making effective use of technology and chooses a suitable scale when creating graphs.			

Mental Strategies	Skills	Possible Resources	Assessment
Skills (mentally, with jottings and materials if needed) Skip counting for intervals on a scale	**Display** **I can create a bar graph with the following:** • **Title** • **x and y axes labelled** • **Constant on x axis** • **Variable with appropriate scale on y axis** • **Equal spacing between bars** **I can create a bar line graph with the following:** • **Title** • **x and y axes labelled** • **Constant on the x axis** • **Variable with appropriate scale on y axis (Does not need to start at 0)** • **Equal spacing between lines**	TJ 2a Ch 18 Ex 3 Qu 4 – 6 pg 181 Linked to work in MNU 2-20a & MNU 2-20b	

Topic & CfE Outcome - 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

Benchmarks
- Uses the language of probability accurately to describe the likelihood of simple events occurring, for example equal chance; fifty-fifty; one in two, two in three; percentage chance; and $\frac{1}{6}$
- Plans and carries out simple experiments involving chance with repeated trials, for example, 'what is the probability of throwing a six if you throw a die fifty times?'.
- Uses data to predict the outcome of a simple experiment.

Mental Strategies	Skills	Possible Resources	Assessment
	I can talk about how likely or unlikely it is that an event will happen **I know that probability is a measure of likelihood** • I can talk about how likely something is to happen using a wide range of vocabulary • I can order events on a simple probability scale, e.g. a scale labelled from impossible to certain, in words • I can give examples of events and make sensible predictions about their likelihood • I can create my own simple probability scale and place events on this	HAM Teaching Cards IH 2.4 H5 Teacher's Notes pgs 253 – 255 H5 Tbk pgs 122 & 123 TJ 2b Ch 18 Ex 1 pg 160 H6 Teacher's Notes pgs 270 – 276 H6 Tbk pgs 123 – 125 http://nrich.maths.org/5516	<u>**Write**</u> HAM Question Bank IH 2.4 <u>**Say**</u> Say three simple probability statements to the children. The children order them from most likely to unlikely. Discuss any differences in answers. <u>**Say and Do**</u> Say two statements, for example, 'I will watch TV tonight' and 'I will visit Mars'. Repeat with a range of statements including some whose probability is similar and ask children to justify their choices. Ask children to make up pairs of statements to read out for the class or for their group to vote on. <u>**Do**</u> Sit children in a circle with an object to pass around. Say a statement to start with, for example, 'Next week it will rain', and pass the object to the next person. Toss a coin – heads means more likely and tails less likely. The next person has to say a statement which is more or less likely than the previous statement depending on the coin toss. Keep going around the circle until you have created a chain of statements.

Strategies

By the **END** of Second Level, Learners should understand when to use and be able to apply the following strategies. Knowledge of, understanding and application of these strategies should be built **across** the level.

* Emphasise the importance of using mental maths skills and recall in a variety of contexts, e.g. Money

* Explore and use correctly a variety of mathematical language related to addition, subtraction, multiplication and division

Addition and Subtraction

* Emphasise the use of estimation and rounding in calculations

* Count on or back in hundreds, tens and ones. Progress to tenths then hundredths

* Subtract by counting up from the smaller to the larger number

* Reordering – 25 + 3 + 15 + 8 = 25 + 15 + 8 + 3

* Partitioning strategies:

- 47 + 58 - add tens and ones separately then recombine. Progress to hundreds

- 91 - 35 - subtract tens then ones. Progress to hundreds (Subtract in Chunks)

- 56 + 29 - add or subtract a multiple of 10 and adjust (Making Tens)

- 38 + 37 - double and adjust

* 4·3 + 2·9 = 4·3 + 3 – 0·1 – add or subtract a whole number and adjust

- How long from 3.45pm to 4.20pm? Count on and back in minutes and hours, bridging through 60 (analogue and digital times, progressing to 12 hour and 24 hour clock)

- Use knowledge of place value and related calculations, e.g. 140+150=290 using 14 + 15=29. Progressing to decimals – 6·3 - 4·8 using 63 - 48, 0·68 + 0·43 using 68 + 43

Multiplication and Division

* Emphasise the use of estimation and rounding in calculations

* **32 x 5, 14 x 20** - Form an equivalent calculation, e.g. to multiply by 5 – multiply by 10 then halve, to multiply by 20 – double then multiply by 10 or multiply by 10 then double.

* **32 x 50, 48 x 25**, e.g. to multiply by 50 – multiply by 100 then halve. To multiply by 25 – multiply by 100, then halve and halve again

* **When dividing by 50**, form an equivalent calculation e.g. divide by 100 then double. To divide by 25 – divide by 100 then multiply by 4

* **4·3 x 10, 673 ÷ 100** – use understanding that when a number is multiplied or divided by 10 or 100, its digits move one or two places to the left or the right relative to the decimal point, and zero is used as a place holder

* **When calculating with multiples of 10**, use knowledge of multiplication and division facts and understanding of place value e.g. 60 x 30

* **Partitioning method for division -** 98 ÷ 7 = (70 + 28) ÷ 7 = 10 + 4 = 14

* Use knowledge of equivalence between fractions and percentages, e.g. to find 50% ($\frac{1}{2}$), 25% ($\frac{1}{4}$), 10% ($\frac{1}{10}$)

* **Scale up or down using multiplication and division** – e.g. if three oranges cost 24p: one orange costs 24 ÷ 3 = 8p then four oranges cost 8 x 4 = 32p