Progression and Support Document
Second Level – Pathway 1

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 1
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 1	Opportunities across the curriculum
Estimation and rounding MNU 2-01a **Number and number processes MNU 2-03a** Money MNU 2- 09a & MNU 2-09c	
Number and number processes MNU 2-02a **Multiples, factors & primes MTH 2-05a** **Patterns & relationships MTH 2-13a** Expression and equations MTH 2-15a	
Properties of 2D shapes & 3D objects MTH 2-16a Angle, symmetry & transformation MTH 2-17a	
Measurement MNU 1-11a & MNU 2-11b (length, weight and volume & capacity)	
Measurement MNU 2-11c Angle, symmetry & transformation MTH 2-17c Angle, symmetry & transformation MTH 2-18a	
Angle, symmetry & transformation MTH 2-19a	
Fractions MNU 2-07a & MTH 2-07c	
Time MNU 2-10a & MNU 2-10b	
Data & analysis MNU 2-20a, MNU 2-20b & MTH 2-21a	

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 Angle, symmetry & transformation MTH 2-17a	Whilst exploring the properties of 2D shapes and 3D objects in MTH 2-16a, angles within the shapes can be explored for MTH 2-17a which would be a natural connection to make anyway so it is sensible to look at these experiences and outcomes together in a bundle. 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 a class novel – 'Charlie and the Chocolate Factory' by Roald Dahl Using what I know about the features of different types of texts, I can find, select, sort and use information for a specific purpose. **LIT 2-14a**	Naturally when discussing a text in class, characters or settings will be discussed and compared. This is an opportunity to explore sorting as you compare words to describe two different characters for example, using a Venn Diagram. Depending on the text, other sorting activities could take place, i.e. **'Charlie and the Chocolate Factory' by Roald Dahl** – providing words to describe the winners of the Golden Tickets then sorting these using a Venn or Carroll Diagram **MNU 2-20a/b.** Using Aiden Chamber's Three Sharings, discuss the text then collate information based on the discussion which can then be displayed in a variety of ways, i.e. bar graph of feelings about the text – 'What words can we use to describe how we feel about Charlie's life?', tally of connections to own life – 'How do our lives compare?' **MNU 2-20a/b & MTH 2-21a** Provide 'chocolate bars', include at least one with a hidden Golden Ticket. Can you tell by weighing the bars which bars have a Golden Ticket? How could manufacturers get around the problem of it being detectable by weight? **MNU 2-11a & MNU 2-11b** Give dimensions for a box that will hold multiple 'Wonka Bars'. The children are challenged to make the box then fill it with Wonka Bars to see how many it will hold. Ask the children to work out how much each box is worth in money by giving them a cost per bar. **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 One

Number & Number Processes	Number & Number Processes	Measurement	Angle, symmetry & transformation	Estimating & Rounding	Number and Number Processes	Time	Properties of 2D shapes & 3D objects
MNU 2-02a	MNU 2-03a Add & Subtract	MNU 2-11c Area	MTH 2-17a	MNU 2-01a	MNU 2-03a Multiply &Divide	MNU 2-10a	MTH 2-16a

Data & Analysis	Measurement	Patterns & Relationships	Expressions & Equations	Angle, symmetry & transformation	Angle, symmetry & transformation	Money	Fractions, decimal fractions & percentages
MNU 2-20b	MNU 2-11a MNU 2-11b Length	MTH 2-13a	MTH 2-15a	MTH 2-19a	MTH 2-18a	MNU 2-09a	MNU 2-07a

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

Please note that MNU 2-03b, MTH 2-03c, MNU 2-04a, MNU 2-07b, MNU 2-09b, MNU 2-10c, MNU 2-11a/b (volume), MTH 2-12a, MTH 2-16b, MTH 2-16c, MTH 2-17b, MTH 217d and MNU 2-22a are omitted from this Pathway.

The above is an overview of the Experiences and Outcomes contained in Second Level Pathway 1. 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
<u>Recall</u> 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	<u>Write</u> HAM Question Bank MD 1.7a, MD 1.7b & MD 1.7c <u>Do</u> 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. <u>Do</u> 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.

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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

<u>Recall</u>
Sums and differences of pairs of multiples of 10, 100 and 1000
 	
<u>Skills</u>
(mentally, with jottings and materials if needed)
 	
Calculate approximate answers by rounding, i.e.
29 + 52 =
about 30 + 50
 	
Practise rounding to 10, 100 and 1000 using real-life contexts
 	
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
 	
What must be added to any 3 digit number to make the next multiple of 100, e.g. 521 + ? = 600
	I can round a range of whole numbers to nearest 10, 100 and 1000
	
	I can use rounded number calculations to estimate answers then check against an accurate calculation
	
	• I can round to the nearest 10, 100 and 1000 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. 38 + 59 will be roughly 40 + 60 = 100
	• 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 10, 100 and 1000
		TJ Level B Ch 1
		Ex 3 pg 18
		
		TJ Level C Ch 5
		Ex 5
		Ex 6 pgs 60 – 62
		
		TJ Level D Ch 1
		Ex 9
		Ex 10 pgs 21 – 22
		
		TJ 2a Ch 1
		Ex 4
		Ex 5 pgs 11 – 12
		
		H5 Teacher's Notes pgs 74 – 77
		
		H5 Tbk pgs 29 – 30
		
		http://www.mathsisfun.com/numbers/estimation-game.php
		
		http://nrich.maths.org/1069
			<u>Write</u>
			Provide examples of real-life statistics. Children round the numbers to 10, 100 and then 1000.
			
			<u>Say</u>
			Observe children as they play 'Target'. Children work in pairs to give the complement that would make the number bond to 10 or 100 (whichever you are concentrating on) e.g. one child says 46 and the other child responds with 54 to make 100.
			
			<u>Do</u>
			Call out a specific number for the children to write on a place value grid. The children round the number to the nearest 10, 100 or 1000. Discuss which digits were important in considering how to round the number.
			
			<u>Do</u>
			Give pupils long supermarket receipts with the totals concealed and ask them to estimate the total cost by rounding each item to the nearest pound.
			Supermarket receipts available at:
			http://www.teacherled.com/resources/opadd/shopaddload.html

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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.

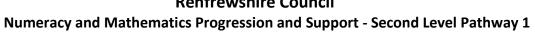| Mental Strategies	Skills	Possible Resources	Assessment
Recall Sums and differences of pairs of multiples of 10, 100 and 1000 Addition doubles of numbers 1 to 100 and their corresponding halves, i.e. 38 + 38 Number pairs which total 100, i.e. ? + 24 = 100 ? + 43 = 100 Numbers that can be added to any three digit number to make the next multiple of 100, i.e. 521 + ? = 600 **Skills** (mentally, with jottings and materials if needed) Order a selection of numbers to 10 000 by considering place value Count on or back in hundreds, tens and ones Use knowledge of place value and related calculations, e.g. 140 + 150 = 290 by using 14 + 15 = 29	**For whole numbers beyond one thousand to 10 000** • Order • Read • Write (digits and words) • Place Value • Partition **I can use digits 0 – 9 in different combinations to show how 4 digit numbers are constructed** **I can identify, extend and predict number sequences involving 4 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 tenths as decimal notation** • Order • Read • Write (digits and words) • Place Value • Partition **I can use digits 0 – 9 in different combinations to show how 4 numbers are constructed to 1 decimal place, using 0 as a place holder.** **I can identify, extend and predict number sequences involving numbers up to 10 000 and to 1 decimal place.** • I know that a decimal fraction is a representation of part of a whole number • I can identify and write tenths as fractions • I know that a decimal is another way to represent tenths • I can change any tenths fraction to a decimal • I can identify the position of tenths on a number line • I can change any mixed number or improper fraction with tenths to a decimal • I can use a decimal point in the correct place to separate the whole numbers and the tenths • I can talk about how decimal fractions are used in everyday life	HAM Teaching Card WN 2.1, WN 2.2, WN 2.5a TJ Level C Ch1 Ex 1 pgs 8 – 10 TJ Level D Ch 1 Ex 1 pgs 8 – 10 H5 Teacher's Notes pgs 35 – 40 H5 Wbk pgs 2 – 3 H5 Tbk pgs 7 – 8 Tenths TJ 2a Ch 5 Ex 1 pgs 37 – 38 TJ Level D Ch 3 Ex 1 pgs 33 – 34 H5 Teacher's Notes pgs 118 – 122 H5 Wbk pg 13 H3 Tbk pgs 52 – 53 H6 Teachers Notes pgs 92 – 93 H6 Tbk pg 36 http://nrich.maths.org/6605 http://www.mathsisfun.com/place-value.html	**Write** HAM Question Bank WN 2.1, WN 2.2 & WN 2.5a **Write** Give children 4 digits and ask them to: make the largest 4 digit number, make the lowest, make the largest even number etc. This could also be done cooperatively by each children writing a digit on a whiteboard. The children would then have to arrange themselves to fit the criteria. **Do** On a whiteboard the children write a true or false statement about the digits of a 4 or greater digit number, e.g. 'The number 9562 has 9 hundreds' or 'The digit 5 in the number 1250 is worth 5 tens'. Discuss the statement. If a statement is false child who wrote it should explain how the statement could be changed to make it true. **Do** Display a 4 or greater digit number with a particular digit circled. The children have to respond on their whiteboards or by holding up a digit flip card, showing what they circled digit represents, e.g. if 56 234 is shown with the 2 circled, children should be able to respond with either 200 displayed on digit flip cards or two hundreds written on their whiteboards. This activity could also be done with tenths.

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**

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 two digit numbers, including crossing the 10s and 100 boundary, e.g. 57 + 48 and 81 – 35 Add near doubles of three digit numbers, i.e. 128 + 127 Add or subtract a near multiple of 10, e.g. 56 + 29 86 - 38 Add or subtract 2 or 3 digit multiples of 10 e.g. 140 – 20, 120 + 150 and 470 – 280 **Partition**: add tens and ones separately, then recombine **Partition**: subtract	**Add and Subtract** **I can add and subtract 2 digit numbers mentally using a variety of strategies** **Without a calculator, I can add and subtract 4 digit whole numbers in written form** • I can use a 100-square to work out my calculations • I can use an empty number line to help with my calculations • I can partition the numbers to help me add and subtract • I can use my number bonds to help me • I can add multiples of 10 together using my number bonds • I can partition a number into hundreds, tens and ones **Formal Written Method** • I can lay out a written calculation with the digits lined up correctly in units, tens and hundreds columns • I know I add the ones first, then the tens and then the hundreds • I know if the ones total is less than 10, I record it in the ones column • I know if the ones total is 10 or more, I record the ones in the ones column, then record the amount of tens in the tens column using a small number • I can add the tens and record it in the tens column if it is less than 10, or in the hundreds and tens columns if it is 10 or more • I can add the hundreds and record it in the hundreds column if the total is less than 10 and in the hundreds and thousands if the total is 10 or more • I can estimate what I think an answer is going to be near and can check it afterwards to see if my answer is sensible • I can partition a number and talk about how many tens and how many ones it has • I can lay out a written sum with the digits lined up correctly in ones and tens columns • I know I subtract the ones first, then the tens, then the hundreds • I know if the ones digit of the bottom number is larger than the ones digit of the top number, I need to exchange a 10 from the tens column to help me work out the ones digit • I know if I exchange a 10, I need to show I have done this in my working • I can repeat this for the tens column then the hundreds column • I can estimate what I think an answer is going to be and can check it after to see if my answer is sensible	**Add and Subtract** HAM Teaching Cards AS 1.8c, 1.9b, 1.10b (Revision) TJ Level C Ch1 Ex 2 pgs 11 – 14 TJ Level D Ch 1 Ex 2 pgs 11 – 12 (select questions with appropriate number range) TJ 2a Ch 1 Ex 2 Ex 3 pgs 8 – 10 (select questions with appropriate number range) H5 Teacher's Notes pgs 42 – 49 H5 Wbk pg 4 H5 Tbk pgs 9 – 12 http://www.mathsisfun.com/numbers/addition-column.html http://www.mathsisfun.com/numbers/subtraction-regrouping.html	**Write** HAM Question Bank AS1.8c, AS 1.9b & AS 1.10b **Write** TJ Level C Ch 1 Topic in a Nutshell pg 15 – 16 **Say, Make and Do** Carry out a 'Number Talk' with the children. Write an addition or subtraction calculation on the board. Ask the children to find as many different ways as they can to solve and represent this calculation, e.g. using concrete materials, a number line, 100-square, base 10 materials, jottings, partitioning, etc. Discuss the different methods and which they find the most efficient and why. You could use a 'Think Board' to encourage use of particular methods. **Say and Write** Create two 3 digit numbers by randomly picking six single digits cards or by rolling a dice six times. Once the children have their two 3 digit numbers they should add them together. They should rearrange the digits until they have exhausted all combinations. Explore which combinations give the largest and smallest totals. Order the totals from smallest to largest. Allow the children to select the method that they wish to use. You may also wish to direct them to particular methods if you are assessing the ability to use particular strategies. **Write** Use the following to assess progress in subtracting 3-digit numbers: • without exchanging, e.g. 756 and 423 • exchanging the 10, e.g. 760 and 427 • exchanging the 10 and the 100, e.g. 632 and 489 • including zeros in any of the

tens and then ones, e.g. subtracting 37 by subtracting 30 then 7

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

columns.
Say and Write
Record several subtraction calculations using the formal written method, on the board. When recording the calculations, include a couple that have errors. Ask the children to find those with errors. Ask the children to work out what has gone wrong in the incorrect calculations and correct them. Discuss the corrections.

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 whole numbers by two digit numbers.
- Divides whole numbers and decimal fractions to two decimal places, by a single digit, including answers expressed as decimal fractions, for example, $43 \div 5 = 8 \cdot 6$.

Mental Strategies	Skills	Possible Resources	Assessment
Recall Recite and recall all multiplication facts and 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) 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 Multiply and divide numbers to 1000 by 10 and 100 (whole number answers only), e.g. 345 x 10, 53 x 100, 170 ÷ 10, 600 ÷ 100 and 860 ÷ 10 Multiply a multiple of 10 to 100 by a single digit number, e.g. 40 x 7 Multiply number to 20 by a single digit,	**Multiply and Divide** **I can use multiplication facts from 2 – 10 times tables, mentally** **I can multiply up to 4 digit numbers by a single digit in written form** **I can divide by 6, 7, 8, 9 & 10 mentally for 2 digit numbers** **I can use notation of remainders correctly** **Without a calculator, I can multiply and divide any 4 digit number by a single digit in written form** **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 recite and recall the multiples and table facts of all tables • I can use a range of strategies to help me work out a fact if I cannot instantly remember it • I can answer questions which use a variety of vocabulary, e.g. 'How many groups of …?', 'What is 7 times …?', 'What is the product of …?', 'If I share …?' • I can use my knowledge of how to multiply by 10 to multiply by 100 • Using my knowledge of table facts and multiplying by 10 or 100, I can create new multiplication and division facts, e.g. 3 × 4 = 12 so 30 × 4 = 120, 120 ÷ 4 = 30, 300 × 4 = 1200 • I can partition to help me in my calculations • I can use bridging to help me in my calculations • I know there is more than one strategy for solving calculations and can check my calculation using a different strategy • I can use informal jottings and resources as required • I can use formal written methods to work out calculations • I can multiply and divide numbers to 1000 by 10 then 100 (whole number answers) e.g. 235 x 10, 52 x 100, 140 ÷ 10, 9000 ÷ 100 **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**	**Multiply and Divide** HAM Teaching Cards WN 2.3, WN 2.4 TJ Level C Ch 5 Ex 1 Ex 2 pgs 50 – 56 TJ Level D Ch 1 Ex 6 Ex 7 pgs 17 – 19 TJ 2a Ch 3 Ex 1 Ex 2 pgs 20 – 24 H5 Teacher's Notes pgs 62 – 69 H5 Wbk pgs 5 – 6 H5 Tbk pgs 18 – 19, 20 – 27 H5 Teacher's Notes pgs 84 – 96 H5 Wbk pgs 8 – 10 H5 Tbk pgs 34 – 43 http://www.mathsisfun.com/quiz/sixtimes.html http://www.mathsisfun.com/quiz/seventimes.html http://www.mathsisfun.com/quiz/eighttimes.html http://www.mathsisfun.com/quiz/ninetimes.html http://www.mathsisfun.com/numbers/division.html http://www.mathsisfun.com/numbers/division-remainder.html	**Write** HAM Question Bank WN 2.3, WN 2.4 **Do** Place a chair at the front of the class. Children stand in a line and the first child sits in the chair. Ask a question for the sitting person and the first standing person to answer. If the sitting person answers correctly first, he/she stays in position and the other pupil goes to the end of the line. If the standing person is first, he/she takes over in the hot seat. Continue, seeing how long someone can stay in the hot seat. **Do** Create a target. This could be a line of hoops or buckets at different distances. Assign a value to each part of the target. Split the children into groups. Ask each child a multiplication or division problem in turn and if they correctly answer they can throw a ball at the target. You can also pit the teams against each other: ask both teams the same question, and the first team to answer gets a shot or it could be a race against the clock to win the most points.

e.g. 17 x 6 Identify the remainder when dividing by 2, 5 or 10 Give the factor pair associated with a multiplication fact, e.g. identify that if 3 x 4 = 12 then 12 has the factor pair 3 and 4 Partition: double or halve the tens and ones separately, then recombine Use knowledge of multiplication facts and place value, e.g. 7 x 9 = 63 to calculate 70 x 9 and 7 x 90 Use partitioning and the distributive law to multiply e.g. 14 x 6 = (10 + 4) x 6 = (10 x 6) + (4 x 6) = 60 + 24 = 84	**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.**	http://www.mathsfun.com/timestable.html http://www.mathsisfun.com/numbers/math-trainer-multiply.html	

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 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 timestables • I can recite my 5 and 10 timestables • I can recall individual multiplication and division facts in my 5 and 10 timestable • I can recite my 3, 6 and 9 timestables • I can recall individual multiplication and division facts in my 3, 6 and 9 timestables • I can recite the 7 timestable • I can use the link between timestables 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 a multiple and ask the children to write a timestables fact with that answer on their 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 on the chair. Call out a multiple, e.g. 24, the first to respond with a correct fact using the multiple wins the seat.

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 Recall whether a number will be divisible by two by considering whether it is even or odd. Look at ones digit to decide Odd and even numbers to 1000 Identify common percentages and the equivalent fractions that represent them	**Fractions** **I have had opportunities to use materials and visual representations to support my learning** **I understand and can use the terms numerator and denominator** **I can find a unit fraction of a whole number, $\frac{1}{2}$, $\frac{1}{4}$ etc.** • I can find a unit fraction of a number by sharing it into equal parts and know that this is the same as dividing • I know a fraction is a way of describing a part of a whole and I know each part is equal • I know the bottom number (denominator) of the fraction is the number to divide by • I know how to find a unit fraction of a number by dividing • I can create pictures and models of unit fractions of shapes and of quantities and on a number line • I can identify what unit fraction is shown of a shape and of a quantity • I can compare unit fractions by understanding that a bigger denominator means a smaller fraction • I can write a unit fraction in words and numbers, using the correct notation and vocabulary • I can count up in a given fraction, changing the fraction to whole numbers when I need to • I can use shapes to create pictures and models of simple non-unit fractions • I know how to find a fraction of a number by dividing • I can identify a simple non-unit fraction of a quantity • I know and can explain what the denominator and numerator of a fraction mean • I know that a fraction with the same numerator and denominator is equivalent to 1 • I can recognise whether a fraction is bigger or smaller than 1 by comparing the numerator and denominator **Percentages** **I know common percentages and their equivalences** • I can use a picture split into hundredth and explain how to change a simple percentage in to a fraction – 50% = $\frac{1}{2}$, 25% = $\frac{1}{4}$, 10% = $\frac{1}{10}$, 75% = $\frac{3}{4}$ etc.	HAM Teaching Cards FDP 2.1, FDP 2.2 TJ 1b Ch 16 Revision of Fractions pg 184 TJ 1b Ch 16 Ex 1 pgs 185 – 187 TJ Level C Ch 10 Ex 1 pgs 109 – 112 Ex 3 pgs 117 – 118 TJ 2a Ch 11 Ex 1 pgs 97 – 99 Ex 3 pgs 102 – 103 H5 Teacher's Notes pgs 100 – 105 H5 Tbk pgs 44 – 45	**Write** HAM Question Bank FDP 2.1, FDP 2.2 **Write** TJ Level B Ch 12 Topic in a Nutshell pgs 151 **Do** Children choose a unit fraction to draw. They record their fraction in three ways: - written in words, as a fraction and as a picture – on three small pieces of paper or card. All the cards are put together, shuffled and laid out on the table. Children work together to sort the cards into matching trios. **Say** Give the children a number. Ask them to think of a unit fraction of a whole number that would give them that answer, i.e. If you call out 4, they may say $\frac{1}{2}$ of 8 or $\frac{1}{3}$ of 12 etc. **Do** Draw a 3×3 grid on the board and fill it with multiples of a number. Children draw their own 3×3 grid and fill the cells with the unit fractions of the number, i.e. if you use multiples of 5 children find fifths of the number. Another way to do this is to draw two 3x3 grids on the board but this time make the multiples in the first grid a variety, not just from the same multiplication table. In the second grid, put the answer to a unit fraction calculation. The children then have to look at the multiple and the answer and find out what unit fraction was used to calculate the answer, i.e. if the cell in multiple grid is 32 and the matching cell in the answer grid is 8 the children will have to work out that the unit fraction used to get this answer

was $\frac{1}{4}$.

$75\% = \frac{3}{4}$

$50\% = \frac{1}{2}$

$25\% = \frac{1}{4}$

$10\% = \frac{1}{10}$

Skills
(mentally, with jottings and materials if needed)

Find unit fractions of numbers and quantities, e.g.
$\frac{1}{2}$ of 20, $\frac{1}{4}$ 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)
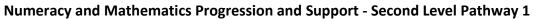also known as the **grid method**

Divide by grouping and sharing

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.

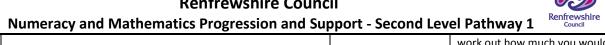| Mental Strategies	Skills	Possible Resources	Assessment
Recall Recite and recall all multiplication facts and corresponding division facts	**I can demonstrate an understanding of simple equivalent fractions using diagrams, fraction boards, fraction cubes etc.** **I understand simple equivalences in fractions, e.g.** $\frac{1}{2} = \frac{2}{4}$ **I know what improper fractions and mixed numbers are** **I can convert between improper fractions and mixed numbers** • I can use pictures, fraction wheels and fraction walls to compare fractions • I can compare fractions using a number line • I can find equal fractions • I can multiply the numerator and the denominator of a fraction to create an equivalent fraction • I can compare unit fractions by looking at the denominator, knowing that a bigger number means a smaller fraction • I can compare fractions which have the same denominator, knowing that the bigger fraction has the bigger numerator • I can explain what improper fractions and mixed numbers are and can give examples of both • I can change an improper fraction into a mixed number by working out how many whole ones can be made from the parts • I can change a mixed number into an improper fraction by changing the whole number into appropriate fraction parts and adding on the remaining fraction	HAM Teaching Card FDP 2.3, 2.4 TJ Level C Ch 10 Ex 2 Qu 1 – 3 pgs 113 – 114 TJ Level D Ch 11 Ex 2 Qu 1 – 6 pgs 130 – 131 TJ 2a Ch 11 Ex 3 Qu 1 – 6 pgs 100 – 101 H5 Teacher's Notes pgs 105 – 106 H5 Wbk pgs 11 – 12 H6 Teacher's Notes pgs 85 – 86 H6 Tbk pg 35 H7 Teacher's Notes pgs 62 – 63 H7 Tbk pg 22	**Write** HAM Question Bank FDP 2.3, FDP 2.4 **Do** Use a 10 sided dice to roll the denominator of a fraction. Ask the children to draw an equivalent fraction on their white board on in their journal. They can represent the equivalent fractions in the manner of their choosing, i.e. fraction notation, drawing, number line, fraction wall, drawing etc. **Do** Ask half the class write a 1 digit number on their mini whiteboard and the other half write a fraction. (Set the parameters around this) Ask the children to walk around the class and when you signal them to stop, they find the nearest person from the other half of the class. The children then make a mixed number with the number and fraction from their boards and work together to change it to an improper fraction. **Do** Tell the children that they are going to form a fraction number line with the improper fractions that they are given. Mark five boards with improper fractions and give them to five children. Use same denominator initially. Ask the children to order themselves on the numberline. Repeat with mixed numbers.

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
Recall Rounding for estimating total costs	**I can talk about the different ways that money is represented and accessed**	HAM Teaching Cards MF 2.2, MF 2.3, MF 2.4	**Write** HAM Question Bank MF 2.2, MF 2.3 & MF 2.4
Number bonds to 100	**I have developed a sense of costs, value and pricing**	TJ 1b Ch 7 Ex 2 Ex 3	**Write** TJ 1b Ch 7 The 3 R's pgs 83 – 84
Counting on in 10s	**I have investigated simple offers i.e. buy one get one free, 3 for 2, to decide which is most cost effective**	Ex 4 pgs 79 – 82	**Write** TJ Level C Ch 3 Topic in Nutshell pgs 33 – 34 Qu7 – 13
Skills (mentally, with jottings and materials if needed)	**I can work to a budget to buy certain items** **I can work with money to the value of £20**	TJ Level C Ch 3 Ex 2 Ex 3 pgs 28 – 32	**Write** TJ Level D Ch 9 Topic in Nutshell pgs 114 Q1 – 4
Apply mental strategies and skills from **MNU 2-03a** in context of money	**I can apply my mental agility strategies and the formal written method as appropriate to help with money calculations**	TJ Level D Ch 9 Ex1 Ex 2 Ex 3 Q1 – 8 pgs 106 – 111	**Say and Do** Discuss the pros and cons of each of the following methods of shopping: high street shop; internet store; catalogue. Consider the cultural capital differences that may exist for children so that this is not limiting their success in the activity.
	• I can talk about ways to access money • I can talk about representations of money such as vouchers, credit cards, pre-pay tickets etc. • I can talk about how to be safe with money, e.g. where to keep it etc. • I can talk about the items or services which people spend money on • I can give examples of the items or services I need and others I might want • I can prioritise my wants and needs • I can talk about ways and different places where I might spend money • I can estimate the price of different items or services according to their relative value • I can price items according to the value that I or others would give them • I know that things are priced differently depending on where they are sold • I can compare the cost of an item with how much I am prepared to spend • I can make decisions about what I spend my money on according to what is important to me • I can think about costs that may be hidden when I make a purchase such as VAT and service charges • I can use addition, subtraction, multiplication and division strategies in relation to money • I can talk about different offers I have seen, what they mean and how to work out the price I will pay • I can work out the unit cost per item if I know the price of several and can use this when comparing the cost of different items • I can make choices about what represents best value to me given my circumstances • I can talk about shops' loyalty schemes and how they can help to save money	TJ 2a Ch 8 Ex 1 Ex 2 Ex 3 Qu 1 & 2 pgs 69 – 73 H5 Teacher's Notes pgs 55 – 56 H5 Tbk pgs 15 – 16 TJ Needs and Wants (Finance unit) Available for free-download from TJ website	**Do** Show children products that are in a deal. Ask children to work out which is better value. For example fizzy drinks in a six-pack costing £4 or in a 'three for two' offer where a single bottle costs 70p. Children work out the unit cost of the drink in each deal and compare. Discuss which deal they would buy and consider when they might want six of something and when buying so much might be wasteful. **Do** Ask the children to look on specified websites to price a specific item/s. Children to find items then discuss which offers give the best value for money. **Do** Tell children the price of something you want to buy and how much you have already saved. Get the children to work out how much you still need to save to be able to afford the item. Extend this by giving a time frame so that they can

			work out how much you would need to save weekly to meet your target.

Topic & CfE Outcome - Money				
I can use the terms profit and loss in buying and selling activities and can make simple calculations for this **MNU 2-09c**				

Benchmarks				
- Calculates profit and loss accurately, for example, when working with a budget for an enterprise activity.				

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 can use processes already learned to calculate simple profit and loss** **I can explain the terms profit and loss** **I can describe making money using the term 'profit' and losing money using the term 'loss'** **I can calculate profit and loss in a context** **I can use a calculator to +, -, x and ÷ to solve problems** **I understand what a business has to do in order to make a profit** **I can use vocabulary associated with business: expenditure, selling price, competitive and small/ large businesses**		TJ Profit and Loss (Finance unit) Available for free-download from TJ website	**Write** TJ Profit and Loss Finance unit "Extended learning" section at the end of the resource **Write and Do** Tell children that you are going to give them some examples of businesses' costs and sales. They write P for profit or L for loss and the amount on their whiteboard. Give amounts which are appropriate to the group's mental computation skills.

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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 tell the time in 5 minutes increments and in 1 minute increments using both analogue and digital clocks** **I have been introduced to duration in hours and minutes** **I have begun to use the 24 hour clock** **I have begun to use timetables set out in both 12 and 24 hour clock times** • I can talk about different time devices I have seen people use • I have explored advantages and disadvantages of a variety of electronic and paper-based timetables and schedules • I know the units we use to measure calendar time and how they relate to each other • I can talk about and use a range of time vocabulary • I recognise that times are different in different parts of the world • I can recognise, show and read any 12 hour time on both analogue and digital clocks • I can find corresponding analogue and digital times • I can talk about am and pm times • I can solve simple problems involving durations or start and finish times • I can make conversions between seconds, minutes and hours • I can adapt number calculation strategies when working with time and convert between units	HAM Teaching Cards T 2.1, T 2.3 TJ Level B Ch 13 Ex 4 pg 161 TJ Level C Ch 4 Ex 1 Ex 2 Ex 3 Ex 4 Ex 5 pgs 35 – 46 TJ Level D Ch 4 Ex 1 pgs 45 – 46 TJ 2a Ch 4 Ex 1 Ex 2 pgs 28 – 30 H4 Teacher's Notes pgs 198 – 212 H4 Tbk pgs 64 – 72 H5 Teacher's Notes pgs 170 – 181 H5 Tbk pgs 80 – 90 http://nrich.maths.org/6071 http://www.mathsisfun.com/time.html http://www.mathsisfun.com/measure/months.html	**Write** HAM Question Bank T 2.1, T 2.3 **Write** TJ Level C Ch 4 Topic in a Nutshell pgs 47 - 49 **Write** Have a 'Maths Chat' about equivalences with units of time. Ask a series of questions such as: 'How many minutes are in three and a quarter hours?' 'How many days are in December and January?' 'How many minutes are in a week?' etc. Chat with the children about how they worked out their answers. Which way was the most efficient way? **Say** Project or show an analogue clock and set it to a time, specifying am or pm. Children work in pairs. One child says the time and what they might be doing at that time, e.g., 'At 5:30 pm I might be at football training.' 'At 1:30 am I would be sleeping.' **Do** Say a 12 hour time and ask the children to respond by displaying the 24 hour equivalent on their whiteboards.

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

Benchmarks
- Chooses the most appropriate timing device in practical situations and records using relevant units, including hundredths of a second.
- Selects the most appropriate unit of time for a given task and justifies choice.

Mental Strategies	**Skills**	**Possible Resources**	**Assessment**
Recall 1 minute = 60 seconds **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)	**I have investigated timing in seconds** **I can make conversions between seconds, minutes and hours** • I have a sense of how long a second, minute or hour lasts and can use this to plan events and tasks • I can select and use appropriate equipment to measure events and tasks in hours, minutes and seconds • When comparing a number of tasks I can estimate how long each will take • I have explored what can be achieved in a given time period	HAM Teaching Cards T 2.2 TJ Level D Ch 4 Ex 3 pgs 49 – 50 TJ 2a Ch 4 Ex 3 pg 35 TJ 2b Ch 3 Ex 3 pg 25 H6 Teacher's Notes pgs 199 – 203 H6 Tbk pg 91	**Write** HAM Question Bank T 2.2 **Do** Split the class into two groups. One child from each group comes out to the front. Tell the children that they are going to estimate when a period of time is over by raising their hand. Get the children to stand back to back so that they cannot see each other's reactions. State the time they have to estimate, i.e. 15 seconds, and see who estimates most closely to the given time. This can also be done with the whole class at the same time although it will be more difficult to keep track of when each child raises their hand.

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 **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	**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** • I have explored when estimation might be a useful alternative to accurate measurement • I can use my calculation skills e.g. halving and rounding to help me estimate a measurement **Length** **Work with metres and cm** **Use metres and centimetres in calculations** **I can select appropriate equipment to measure length** **I can use the length of a ruler or metre stick to help me estimate the length of other items in terms of $\frac{1}{4}$, $\frac{1}{2}$ and $\frac{3}{4}$ of a metre** **I can use the vocabulary and metric units of length for metre (m) and centimetre (cm)** **I can compare an actual measurement to an estimate to establish if answer is sensible** • I can measure in metres and centimetres • I can use the appropriate abbreviations for metres and centimetres • I can read scales to the nearest centimetre • 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** **I can suggest suitable equipment for measuring items, e.g.**	HAM Teaching Cards M 2.2 **Length** TJ Level B Ch 15 Ex 2 Ex 3 (estimating lengths before measuring) Ex 4 pg 179 – 184 TJ Level C Ch 12 Ex 1 Ex 2 Ex 3 Ex 4 pgs 137 – 142 H5 Teacher's Notes pgs 149 – 151 H5 Tbk pg 70 – 71	**Write** HAM Question Bank M 2.2 **Write** TJ Level B Ch15 Topic in Nutshell pg 185 **Do** Measure some items from around the room without the children seeing. Write some of these lengths on the board and ask the children to consider which items from the room you measured and match these too the measurements. If the children need more scaffolding, write the names for the items on the board together with some items that were not included in the measurements and get the children to match the items, leaving out those that do not have a correct match. **Do** Give children a set of cards with different ways or representing the same measurement, i.e. 1·2m, 120cm and 1m 20 cm. Ask the children to match the measurements. **Do** Play a loop game that contains measures as, e.g. cm – 124cm, m - 1·24m, and m and cm – 1m 24cm

	ruler, measuring tape, metre stick, counting stick, trundle wheel etc **I can discuss conversions between related units of measure – cm, m and m and cm and write them using their abbreviations** **Length** • **Work with metres** • **Use metres and centimetres in calculations** • I can convert metres to centimetres • I can convert centimetres to metres • I can convert centimetres to metres and centimetres • I can use the appropriate abbreviations for metres and centimetres		24

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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 **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	**I can use this knowledge to estimate/compare the weights of a variety of objects** • I have explored when estimation might be a useful alternative to accurate measurement • I can use my calculation skills e.g. halving and rounding to help me estimate a measurement **Weight** • **Use grams and kilograms accurately** • **I can use kilograms and grams in simple calculations** **I can select appropriate equipment to measure weight, e.g. pan balance, scale, digital scale etc.** **I can demonstrate that I have a sense of the weight of items, e.g. bag of sugar, and can use this to compare and estimate the weight of other items in terms of $\frac{1}{4}$, $\frac{1}{2}$ and $\frac{3}{4}$ of a kg** **I can use the vocabulary and metric units of weight for kilogram (kg) and gram (g)** **I can compare an actual measurement to an estimate to establish if answer is sensible** • I can give examples of how and why we need to measure • I can use the appropriate vocabulary to talk about the different kinds of measurement we make • I can give examples of metric and imperial units of measurement • I can talk about equivalences between related metric units and write them using their abbreviations • I can read scales to the nearest half kg	**Weight** HAM Teaching Cards M 2.1 TJ Level C Ch 15 Ex 4 Ex 5 Qu 1 – 2 pg 167 – 168 TJ 1b Ch 19 Revision of Weight pg 211 H5 Teacher's Notes pgs 161 – 166 H5 Tbk pgs 75 – 79 http://www.mathsisfun.com/measure/metric-mass.html	**Write** HAM Question Bank M 2.1 **Do** Weigh some items from around the room without the children seeing. Write some of these weights on the board and ask the children to consider which items from the room you weighed and match these too the weights. If the children need more scaffolding, write the names for the items on the board together with some items that were not included in the weighing and get the children to match the items, leaving out those that do not have a correct match.

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 (mm^2), square centimetres (cm^2) and square metres (m^2).
- Calculates the volume of cubes and cuboids in cubic centimetres (cm^3) and cubic metres (m^3).
- Demonstrates understanding of the conservation of measurement, for example, draw three different rectangles each with an area of $24cm^2$.
- Draws squares and rectangles accurately with a given perimeter or area.

Mental Strategies	Skills	Possible Resources	Assessment

<u>Recall</u>
A = l x b
 	
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
	Area
	   • **I can use the formula l x b to calculate area of rectangles and squares**
	   • **I can calculate the area of composite shapes**
	
	• I can explain what is meant by area and can give the units we use to measure it, i.e. cm^2 (Squared)
	• I have made compound shapes from squares and rectangles
	• I can look at a compound shape and split it into squares and rectangles to help me work out its area
	• I have explored how to create shapes with the same perimeter but different areas
	• I have explored how to create shapes with the same area but different perimeters
		Area
		HAM Teaching Cards M 2.4b
		
		TJ Level C Ch 12
		Ex 5
		Ex 6 pgs 143 – 146
		
		TJ 2a Ch 13b
		Ex 1
		Ex 2 pgs 122 – 126
		
		H5 Teacher's Notes pgs 154 – 158
		
		H5 Wbk pgs 27 – 28
		
		H5 Tbk pgs 72 – 74
		
		H6 Teacher's Notes pgs 170 – 177
		
		H6 Wbk pgs 25 – 27
		
		H6 Tbk pgs 79 – 80
			<u>Write</u>
			HAM Question Bank M 2.4b
			
			<u>Do</u>
			Give the children cm^2 tiles to use. Give them a total area and ask then to create compound shapes with given criteria, i.e. a symmetrical shape of $30cm^2$, a shape with 6 edges that has an area of $40cm^2$.

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 Recite and recall all multiplication and 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	**I have explored a range of patterns using the same steps** **I have explored a range of patterns using different steps** **I can continue more complex sequences and patterns** • I can recognise a pattern that goes up or down in equal steps • I can continue a pattern with equal steps • I can create my own pattern using addition and subtraction • I can describe the rule of a pattern using addition and subtraction • I can start from a given term in a pattern and work forwards or backwards • I can recognise a pattern that goes up or down in unequal steps • I can describe a pattern and can use this to continue the terms forwards and/or backwards • I can continue a pattern with unequal steps • I can create my own pattern with unequal steps • I can continue a pattern forwards or backwards	HAM Teaching Cards AT 2.1, AT 2.2 TJ Level C Ch 13 Ex 1 Ex 2 pgs 148 – 152 (not questions involving decimal fractions) TJ Level D Ch 15 Ex 1 pgs 164 – 166 TJ 2a Ch 15 Ex 1 pgs 152 – 154 http://www.mathsisfun.com/numberpatterns.html http://nrich.maths.org/1019	**Write** HAM Question Bank AT 2.1, AT 2.2 **Write** TJ Level C Ch13 Topic in Nutshell pg 153 **Do** Write a sequence of numbers in the appropriate range and use sticky notes to cover up several numbers. Children record what they think the numbers are on whiteboards and all reveal together at the same time. Cover different numbers, e.g. several in the middle or one on each end. The more you cover, the more challenging it will be to work out the pattern. Once children have completed several sequences, challenge them to work in pairs and repeat the activity, setting sequences for each other to complete. **Do** Write the first five numbers of an ascending or descending sequence where the steps are unequal but follow a regular pattern, e.g. 1, 4, 9, 16, 25, … (the terms grow by 3, 5, 7, 9). Ask children to give the next three numbers in the sequence and to describe the sequence

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. Understand that the equals sign = signifies balance **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 -** $\Delta + 24 = 38$ $38 - 24 = 14$ $\Delta = 14$ Find the value of a missing number by applying **balancing -** $\Delta + 24 = 38$ $\Delta + 24 - 24 = 38 - 24$ $\Delta = 14$	**I can find an unknown value in an equation** **Using basic addition and subtraction I can replace a letter in an equation with a number** **I can solve word problems by creating and solving equations** • I show understanding that letters or symbols can be used to represent a missing number in a calculation • I can discuss how to find a missing number in calculations • I can work out the output of a function machine if I know the input and the function • I can work out the input of a function machine if I know the output and the function • I can look at the input and output of a function machine and can suggest what the function might be • I can test my suggested function to see if it works with different examples and can change or adapt it if required • I can use an inverse operation (add/ subtract and multiply/ divide) to check my answer • I can assess what information is known and what needs to be calculated	HAM Teaching Cards AT 2.3 TJ Level B Ch 10 Ex 1 Ex 2 Ex 3 Ex 4 pgs 119 – 123 TJ Level C Ch 7 Ex 1 Ex 2 Ex 3 pgs 81 – 87 TJ 2a Ch 10 Ex 1 pgs 88 – 90 (not questions involving decimal fractions) TJ 2a Ch 15 Ex 1 Ex 2 pgs 131 – 132 H6 Teacher's Notes pgs 121 – 124 H6 Tbk pg 55	**Write** HAM Question Bank AT 2.3 **Write** TJ Level B Ch 10 Topic in a Nutshell pg 124 **Write** TJ Level C Ch 7 Topic in a Nutshell pg 88 **Do** Arrange children in pairs, one named in and the other out, each with a whiteboard, on either side of a function machine. Write a function on the machine, e.g. + 9. The in child writes any number they choose onto their whiteboard and shows it to their partner, who writes the out number. Discuss all pairs of inputs and outputs and record them on the board, discussing patterns noticed. Repeat for other functions and ask children in each pair to swap roles. **Do** Represent a group of function machines that has gone wrong and jumbled up the input and output numbers. Ask the children to arrange them correctly. To increase the level of difficulty, include an input and output that don't match together with those that do.

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 Shapes **I can identify common 2D shapes both regular and irregular** **I can discuss edges, vertices, diagonals, sides and angles** **I can create and/or copy tiling** **I can identify and name right angled, equilateral and isosceles triangles**	**2D Shape** TJ Level C Ch 8 Ex 1 Ex 2 pgs 89 – 93 TJ Level D Ch 10 Ex 1 pgs 115 – 117 Ex 4 pgs 122 – 123 TJ 2a Ch 9 Ex 1 pgs 80 – 81 http://nrich.maths.org/1268 http://www.topmarks.co.uk - search 2D shape	**Write** TJ Level B Ch 17 Topic in a Nutshell pg 197 **Write** TJ Level C Ch 8 Topic in a Nutshell pg 99 Q1, 2, 5, 6, 7 and 8 **Write** TJ Level D Ch 10 Topic in a Nutshell pg 127 Q1, 2 and 5 **Do** Fill a bag with shapes either 2D or 3D or for increased challenge include both. Children pick a shape but do not let the other children see it. The child with the shape must describe the shape by its properties. The other children should use their knowledge to identify the shape described.
	3D Objects **I have investigated every day 3D objects and can discuss the names of the shapes and their properties** **I can discuss faces, vertices and edges**	**3D Objects** TJ Level B Ch 17 Ex 2 pgs 192 – 196 TJ 2a Ch 16 Ex 1 Ex 2 pgs 160 – 164 http://www.mathsisfun.com/geometry/common-3d-shapes.html	**Do** Split children into two groups. At the opposite side of the classroom/space, place a hoop for each team and fill it will the shapes that you are working on. The first two children step forward and a clue is given about the shape that have to retrieve, e.g. 'I have two circular faces and one large curved face, what am I?' The children quickly collect the shape and receive a point if correct. The team that collected the correct shape the quickest receives an extra point too. This can be quite competitive so is best played in a large area!

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
Recall Right angle = 90˚ Straight angle = 180˚	**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 use the words acute, obtuse and right angle to describe the angle between a pair of lines.** **I can use the words acute, obtuse and right angle to describe the angles of a 2D shape.**	TJ Level C Ch 9 Ex 1 pgs 101 – 103 Ex 3 pgs 106 – 107 TJ Level D Ch 8 Ex 1 pgs 87 – 88 TJ 2a Ch 6 Ex 1 pg 52 – 53 H5 Teacher's Notes pgs 216 – 218 H5 Tbk pgs 20 – 21 http://www.mathsisfun.com/angles.html http://www.mathsisfun.com/angle180.html	**Do** Children work in pairs to draw and cut out some triangles. They use different colours to show angles of different sizes: green for angles less than a right angle; red for right angles; blue for angles greater than a right angle. Group the triangles to make a display. Do Give a child four pieces of sticky masking tape to stick to a table top. Ask the child to stick their four pieces onto the table, making sure that they cross over. Using a dry-wipe marker, the children can then label each of the angles that have been created by the tape crossing over. The children may begin to see patterns with supplementary and corresponding angles due to the visual nature of the activity. This would be a good extension activity if the children are beginning to identify the connections. (Check beforehand that the marker comes off the table without leaving a permanent mark! Most whiteboard markers work for this.)

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 four main compass points** **I have investigated the size of the angles between the four main 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 know that a right angle is the same as a turn of 90° • I know that an angle of 180° is the same as a straight line • I know that a whole turn is the same as 360° • I can recognise angles which are 270° • I can relate 90°, 180°, 270° and 360° angles to quarter, half, three quarter and one whole turns • I can relate compass points (north, south, east and west) to these angles and the appropriate fractions and turns • I can spot and investigate angles in the world and discuss where and why they are used • I have explored how people give and follow directions in different contexts in life	HAM Teaching Cards SPM 2.2 TJ Level B Ch 14 Ex 3 Ex 4 Ex 5 pgs 166 – 169 TJ Level C Ch 11 Ex 1 Ex 2 Ex 3 pgs 120 – 129 TJ 1b Ch 6 Ex 3 pgs 71 – 72 H5 Teacher's Notes pgs 218 – 225 H5 Tbk pg 23 H5 Tbk pgs 105 & 106	<u>Write</u> HAM Question Banks SPM 2.2 <u>Do</u> Set a starting position and a finish position e.g. facing the board and facing the window, respectively. Children come up with a list of instructions involving turns which get them from the start to the finish position. Discuss how a 360° turn doesn't change the final position as you end up in the same place and how a 180° turn is the same clockwise and anticlockwise. Highlight other angles which have the same final result e.g. 90° clockwise is the same as 270° anticlockwise.

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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
<u>Recall</u> The horizontal location point is noted before the vertical point	**I can plot and identify positions using grid references** **I can plot and identify points using coordinates.** • I know that the horizontal reference/coordinate is written before the vertical reference/coordinate. • I can give and write the coordinates of a plotted point in one quadrant, using correct notation • I can plot coordinates in one quadrant	TJ Level C Ch 11 Ex 4 Ex 5 pgs 130 – 134 TJ Level D Ch 12 Ex 1 pgs 136 – 137 TJ 2a Ch 14 Ex 1 pgs 145 – 146 H5 Teacher's Notes pgs 227 – 230 H5 Tbk pg 107 & 108 http://nrich.maths.org/1259	<u>Do</u> Specify one or two coordinates which children find and cover with counters on a 10 x 10 coordinate grid. Ask them to use these and other coordinates to make a shape. You could specify the shape (e.g. rectangle or isosceles triangle) or you could let them make up their own and discuss all the different shapes they could make.

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 describe what happens when a shape or point is reflected **I can identify whether or not a shape has symmetry.** **I can recognise lines of symmetry in shapes and designs** **I can draw lines of symmetry on given shapes.** **I have explored how triangles and quadrilaterals tessellate. (tile)** • I can select the strategies of folding or using a mirror to check whether a design is symmetrical. • I can complete a simple tessellation of shapes to create a design	TJ Level C Ch 2 Ex 1 pgs 17 – 22 TJ Level D Ch 2 Ex 1 pgs 26 – 28 TJ 2a Ch 2 Ex 1 pgs 14 – 16 H5 Teacher's Notes pgs 198 – 203 H5 Tbk pg 95 – 97 http://nrich.maths.org/1886 www.topmarks.co.uk and search line symmetry	**Do** Give the children a selection of 2D Shapes to draw around then mark on the lines of symmetry. Encourage the children to consider that each shape may have more than one line of symmetry. **Do** Using squared paper, create symmetrical designs and then cut them along their line/s of symmetry. The children work together to piece the symmetrical patterns together. Make sure that some of the designs are similar so that there is chance of debate on pieces. For challenge, deliberately include some examples that are not symmetrical and ask the children to identify the pieces that are not symmetrical and discuss why.

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, simple spreadsheet or simple database** **I can sort data using Venn, Carroll and tree diagrams** **I can communicate my findings** • I can ask and answer questions about information displayed in pictograms and bar graphs • I understand the impact of scale on pictograms and bar graphs and can use this to make sensible choices about what scale to use • I can create my own pictogram or bar graph choosing an appropriate scale, labels for axes and title • I can use my knowledge of bar graphs to create a bar line graph choosing an appropriate scale, labels for axes and title • I can ask and answer questions about bar line graphs • I can use and create Venn, Carroll and tree diagrams to help me to sort by two criteria • I have explored how Venn, Carroll and tree diagrams can sort data by more than two criteria • I have compared how the same information is displayed differently in each diagram • I can choose an appropriate diagram to help me sort by more than two criteria • I can ask and answer questions using Venn, Carroll and tree diagrams	HAM Teaching Cards IH 2.2, IH 2.3 TJ Level B Ch 11 Ex 2 Ex 3 pgs 130 – 134 TJ Level C Ch 6 Ex 2 Q1 – 4 Ex 3 Q1 – 6 Ex 4 pgs 74 –78 TJ Level D Ch 5 Ex 1 Q5 – 9 pgs 53 – 55 Ex 4 pgs 61 – 62 TJ 2a Ch 18 Ex 1 Qu 1 – 5 pgs 173 – 174 H5 Teacher's Notes pgs 236 – 238 H5 Tbk pgs 111 – 114	**Write** HAM Question Bank IH 2.2, IH 2.3 **Write** TJ Level C Ch 6 Topic in a Nutshell pgs 79 - 80 Q2, 4 and 6 **Write** TJ Level D Ch 5 Topic in a Nutshell pgs 63-65 Q2, 3 and 7 **Make and Do** Write up the names of each month; each child adds a tally mark beside their birthday month. Project a blank pictogram template and work with children to create a graph to show this information, with an appropriate scale. Discuss the results. Which month has the most/fewest birthdays? **Say** Tell children that a company has collected data about people's favourite chocolate bar and wants to make a graph to display this. The graph has space for up to 10 intervals on the vertical axis and it must start at 0. Tell them to discuss with a partner what scale of intervals the company could use if the votes range from: • 6 to 58 • 2 to 9 **Say** Show an example of a Carroll diagram which sorts some numbers but which has one mistake. Ask children to write the number which is wrong on their whiteboard. They show their answers at the same time. Ask volunteers to explain where the number should be placed and why.

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 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	**Collate** **I can use questionnaires in oral and written form** **I can use information from researching books and the internet** **Organise** **I can use, record and count tally marks** **I can collect and sort data and present information in tallies, frequency tables and grouped frequency tables** • I can sort and categorise information in my own way • I can collect data and present this information in tally charts and frequency tables • I can ask and answer questions about data in tally charts and frequency tables • I have explored a range of frequency tables and how these can help present information effectively • I can interpret a frequency table • I can gather information to complete a grouped frequency table • I can create a grouped frequency table deciding on appropriate groupings	HAM Teaching Cards IH 2.1 TJ Level B Ch 11 Ex 1 pgs 125 – 129 TJ Level C Ch 6 Ex 1 pgs 69 –71 TJ 2a Ch 18 Ex 1 Qu 6 pg 174 H5 Teacher's Notes pgs 238 – 244 H5 Tbk pgs 115 -118 http://www.mathsisfun.com/data/survey-conducting.html	**Write** HAM Question Bank IH 2.1 **Do** Split the class into groups or tables and ask each group to prepare a tally chart for the digits 0–9. Explain that each group will make a tally chart to record the frequency of the digits in the house numbers of the children in the group. In turn, the children say their house number and the digits are tallied. Once everyone has given their number, they total the numbers for each digit. Compare the results from different groups. Was the same digit most common in all groups? Did anyone get the same or similar results?

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** • **Bars of equal width** • **Equal spacing between bars** **I can ask and answer questions about information displayed in pictograms and bar graphs** **I can show an understanding of the impact of scale on pictograms and bar graphs and use this to make sensible choices about what scale to use** **I can create a pictogram or bar graph using and appropriate scale, labels for axes and title** **I can answer questions about bar line graphs**	TJ Level B Ch 11 Ex 4 pgs 135 – 136 TJ Level C Ch 6 Ex 4 Q7 – 10 pg 76 TJ Level D Ch 5 Ex 1 Qu 10 – 12 pg 55 TJ 2a Ch 18 Ex 3 Qu 1 – 3 pgs 180 – 181 http://www.mathsisfun.com/data/data-graph.php Linked to MNU 2-20a and MNU 2-20b	**Write** TJ Level C Ch 6 Q5 Topic in Nutshell pg 80 Qu 5 **Write** TJ Level D Ch 5 Topic in Nutshell pg 64 Q4 **Write** TJ 2a Ch 18 The 3 R's pg 186 Q2

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