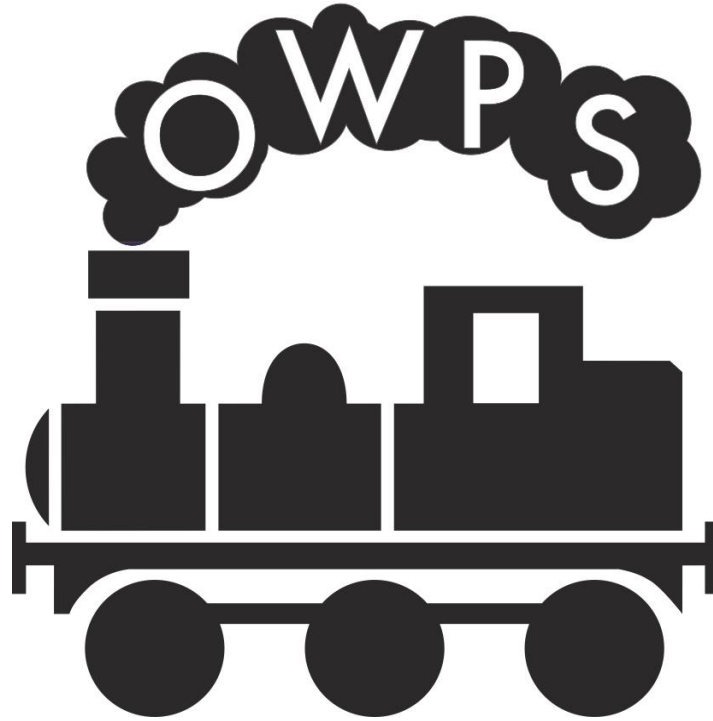


Orton Wistow Primary School



What does mathematics look like?

At Orton Wistow Primary School, we endeavour to deliver a rich and varied mathematics curriculum in line with national expectations.

We aim to develop confident mathematicians who are passionate about their learning. We do this by continuing to develop their conceptual understanding, by using manipulatives, models and images which develop pupils' fluency and by providing a range of opportunities for mathematical reasoning and problem solving, including 'real-life' mathematical scenarios.

This document will outline how mathematics is taught across our school following the maths mastery approach and using the Maths-No Problem scheme.

K Wyatt
Updated July 2020

Contents

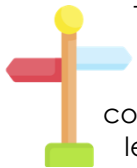
Termly Mapping	3-6
Maths lessons	7-8
Maths Meetings	9
Maths Expectations by Year Group	
Y1	10
Y2	13
Y3	17
Y4	20
Y5	24
Y6	29



This scheme of work is taken from the Maths — No Problem! Primary Maths Series, which is fully aligned with the 2014 English National Curriculum for maths. It outlines the content and topic order of the series.



The scheme of work demonstrates the spiral approach used in the programme, which builds pupils' depth of understanding and mathematical fluency without the need for rote learning. Learning is presented in small-step, logical sequences organised into individual lessons with a title indicating the focus of learning for that lesson. The sequence of lessons is carefully organised with clear lines of progression.



The time allocated to each topic is only provided as a guide and is not meant to be prescriptive. The concepts are broken down into a number of lessons, which offer small-step progression for the most struggling of learners. As such, teachers can use their professional judgement to combine two consecutive lessons into one session as appropriate for their learners. Though teachers can merge lessons within a chapter, it is not recommended to skip or combine chapters.

PRIMARY MATHS SERIES – YEAR 1 AT A GLANCE

	AUTUMN TERM	SPRING TERM	SUMMER TERM
Week 1	Number and Place Value: Numbers to 10 <small>LESSON BREAKDOWN</small>	Calculations: Addition and Subtraction within 20 <small>LESSON BREAKDOWN</small>	Calculations: Multiplication <small>LESSON BREAKDOWN</small>
Week 2		Geometry – Properties of Shape: Shapes and Patterns <small>LESSON BREAKDOWN</small>	Calculations: Division <small>LESSON BREAKDOWN</small>
Week 3	Calculations: Addition and Subtraction <small>LESSON BREAKDOWN</small>	Measurement: Length and Height <small>LESSON BREAKDOWN</small>	Fractions: Fractions <small>LESSON BREAKDOWN</small>
Week 4		Revision and Mid-year (A) Tests	Number and Place Value: Numbers to 100 <small>LESSON BREAKDOWN</small>
Week 5			Measurement: Time <small>LESSON BREAKDOWN</small>
Week 6		Review and Remediation	Measurement: Money <small>LESSON BREAKDOWN</small>
Week 7			Measurement: Volume and Capacity <small>LESSON BREAKDOWN</small>
Week 8	Geometry – Position and Direction: Positions <small>LESSON BREAKDOWN</small>	Number and Place Value: Numbers to 40 <small>LESSON BREAKDOWN</small>	Measurement: Mass <small>LESSON BREAKDOWN</small>
Week 9	Number and Place Value: Numbers to 20 <small>LESSON BREAKDOWN</small>		Geometry – Position and Direction: Space <small>LESSON BREAKDOWN</small>
Week 10		Calculations: Addition and Subtraction <small>LESSON BREAKDOWN</small>	Revision and End-of-year (B) Tests
Week 11	Calculations: Addition and Subtraction within 20 <small>LESSON BREAKDOWN</small>	Calculations: Multiplication <small>LESSON BREAKDOWN</small>	Review and Remediation
Week 12			

PRIMARY MATHS SERIES – YEAR 2 AT A GLANCE

	AUTUMN TERM	SPRING TERM	SUMMER TERM
Week 1	Number and Place Value: Numbers to 100 <small>LESSON BREAKDOWN</small>	Statistics: Picture Graphs <small>LESSON BREAKDOWN</small>	Measurement: Time <small>LESSON BREAKDOWN</small> Measurement: Volume <small>LESSON BREAKDOWN</small>
Week 2		Mid-year (A) Tests and Remediation	
Week 3	Calculations: More Word Problems <small>LESSON BREAKDOWN</small>		
Week 4	Calculations: Addition and Subtraction <small>LESSON BREAKDOWN</small>	Measurement: Money <small>LESSON BREAKDOWN</small>	SATs
Week 5			Calculations: Multiplication of 2, 5 and 10 <small>LESSON BREAKDOWN</small>
Week 6			
Week 7	Calculations: Multiplication and Division of 2, 5 and 10 <small>LESSON BREAKDOWN</small>	Geometry – Properties of Shapes: 2-D Shapes <small>LESSON BREAKDOWN</small>	
Week 8		Geometry – Properties of Shapes: 3-D Shapes <small>LESSON BREAKDOWN</small>	
Week 9	Measurement: Length <small>LESSON BREAKDOWN</small>	Fractions: Fractions <small>LESSON BREAKDOWN</small>	Revision and End-of-year (B) Tests
Week 10			
Week 11	Measurement: Mass <small>LESSON BREAKDOWN</small>	Review and Revisit Topics	
Week 12	Measurement: Temperature <small>LESSON BREAKDOWN</small>		Review and Revisit Topics

PRIMARY MATHS SERIES – YEAR 3 AT A GLANCE

	AUTUMN TERM	SPRING TERM	SUMMER TERM
Week 1	Number and Place Value: Numbers to 1000 <small>LESSON BREAKDOWN</small>	Measurement: Length <small>LESSON BREAKDOWN</small>	Statistics: Picture and Bar Graphs <small>LESSON BREAKDOWN</small>
Week 2			Fractions, Decimals and Percentages: Fractions <small>LESSON BREAKDOWN</small>
Week 3	Measurement: Mass <small>LESSON BREAKDOWN</small>		
Week 4	Measurement: Volume <small>LESSON BREAKDOWN</small>		
Week 5			
Week 6	Mid-year (A) Tests and Remediation		
Week 7	Measurement: Money <small>LESSON BREAKDOWN</small>	Geometry – Properties of Shapes: Angles <small>LESSON BREAKDOWN</small>	
Week 8		Geometry – Properties of Shapes: Lines and Shapes <small>LESSON BREAKDOWN</small>	
Week 9	Measurement: Perimeter of Figures <small>LESSON BREAKDOWN</small>		
Week 10			
Week 11			
Week 12	Calculations: Further Multiplication and Division <small>LESSON BREAKDOWN</small>	End-of-year (B) Tests and Remediation	

PRIMARY MATHS SERIES – YEAR 4 AT A GLANCE

	AUTUMN TERM	SPRING TERM	SUMMER TERM
Week 1	Number and Place Value: Numbers to 10 000 LESSON BREAKDOWN	Calculations: Further Multiplication and Division LESSON BREAKDOWN	Measurement: Money LESSON BREAKDOWN
Week 2			Measurement: Mass, Volume and Length LESSON BREAKDOWN
Week 3			
Week 4	Calculations: Addition and Subtraction within 10 000 LESSON BREAKDOWN	Statistics: Graphs LESSON BREAKDOWN	
Week 5		Fractions, Decimals and Percentages: Fractions LESSON BREAKDOWN	Measurement: Area of Figures LESSON BREAKDOWN
Week 6			
Week 7			
Week 8	Calculations: Multiplication and Division LESSON BREAKDOWN	Measurement: Time LESSON BREAKDOWN	Geometry – Properties of Shapes: Geometry LESSON BREAKDOWN
Week 9		Mid-year (A) Tests and Remediation	
Week 10		Fractions, Decimals and Percentages: Decimals LESSON BREAKDOWN	Geometry – Position and Direction: Position and Movement LESSON BREAKDOWN
Week 11			Number and Place Value: Roman Numerals LESSON BREAKDOWN
Week 12	Calculations: Further Multiplication and Division LESSON BREAKDOWN		End-of-year (B) Tests and Remediation

PRIMARY MATHS SERIES – YEAR 5 AT A GLANCE

	AUTUMN TERM	SPRING TERM	SUMMER TERM
Week 1	Number and Place Value: Numbers to 1 000 000 <small>LESSON BREAKDOWN</small>	Fractions, Decimals and Percentages: Fractions <small>LESSON BREAKDOWN</small>	Geometry – Position and Direction: Position and Movement <small>LESSON BREAKDOWN</small>
Week 2			Measurement: Measurements <small>LESSON BREAKDOWN</small>
Week 3			
Week 4	Calculations: Addition and Subtraction <small>LESSON BREAKDOWN</small>	Mid-year (A) Tests and Remediation	Measurement: Area and Perimeter <small>LESSON BREAKDOWN</small>
Week 5			
Week 6	Calculations: Multiplication and Division <small>LESSON BREAKDOWN</small>	Fractions, Decimals and Percentages: Decimals <small>LESSON BREAKDOWN</small>	Measurement: Volume <small>LESSON BREAKDOWN</small>
Week 7			
Week 8		Fractions, Decimals and Percentages: Percentage <small>LESSON BREAKDOWN</small>	
Week 9			
Week 10	Calculations: Word Problems <small>LESSON BREAKDOWN</small>	Geometry – Properties of Shapes: Geometry <small>LESSON BREAKDOWN</small>	Number and Place Value: Roman Numerals <small>LESSON BREAKDOWN</small>
Week 11	Statistics: Graphs <small>LESSON BREAKDOWN</small>		Review and Revision
Week 12			End-of-year (B) Tests and Remediation

PRIMARY MATHS SERIES – YEAR 6 AT A GLANCE

	AUTUMN TERM	SPRING TERM	SUMMER TERM
Week 1	Number and Place Value: Numbers to 10 Million LESSON BREAKDOWN	Measurement: Measurements LESSON BREAKDOWN	Statistics: Graphs and Averages LESSON BREAKDOWN
Week 2	Calculations: Four Operations on Whole Numbers LESSON BREAKDOWN	Word Problems LESSON BREAKDOWN	
Week 3		Mid-year (A) Tests and Remediation	Number and Place Value: Negative Numbers LESSON BREAKDOWN
Week 4		Fractions, Decimals and Percentages: Percentage LESSON BREAKDOWN	SATs
Week 5		Ratio and Proportion: Ratio LESSON BREAKDOWN	Measurement: Volume LESSON BREAKDOWN
Week 6	Fractions, Decimals and Percentages: Fractions LESSON BREAKDOWN		Geometry – Properties and Shapes: Geometry LESSON BREAKDOWN
Week 7			Algebra: Algebra LESSON BREAKDOWN
Week 8	Fractions, Decimals and Percentages: Decimals LESSON BREAKDOWN	Measurement: Area and Perimeter LESSON BREAKDOWN	Statistics: Graphs and Averages LESSON BREAKDOWN
Week 9			Revisit Topics
Week 10		Geometry – Properties and Shapes: Geometry LESSON BREAKDOWN	Revision and End-of-year (B) Tests
Week 11			
Week 12	Measurement: Measurements LESSON BREAKDOWN	Geometry – Position and Direction: Position and Movement LESSON BREAKDOWN	Revisit Topics

Maths Lessons

We follow the Maths-No Problem! Scheme to teach our mathematics lessons at Orton Wistow Primary School. Each teacher is given a login for the website where all the resources for the scheme can be found.



Teaching for Maths Mastery

The whole class works through the programme of study at the same pace with ample time on each topic before moving on. Ideas are revisited at higher levels as the curriculum spirals through the years.

Differentiated Activities

Tasks and activities are designed to be easy for pupils to enter while still containing challenging components. For advanced learners, the textbooks also contain non-routine questions for pupils to develop their higher-order thinking skills.

Problem Solving

Lessons and activities are designed to be taught using problem-solving approaches to encourage pupils' higher-level thinking. The focus is on working with pupils' core competencies, building on what they know to develop their relational understanding, based on Richard Skemp's work.

Concrete Pictorial Abstract (CPA) Approach

Based on Jerome Bruner's work, pupils learn new concepts initially using concrete examples, such as counters, then progress to drawing pictorial representations before finally using more abstract symbols, such as the equals sign.



Lessons typically are broken into three parts and can last one or more days. Pupils master topics before moving on.

The three parts to a lesson are:

- 1 In Focus Task** – the entire class spends time on a question guided by the teacher. The children are encouraged during this time to think of as many ways as possible to solve the question as possible.
- 2 Guided Practice** – practice new ideas in groups, pairs or individually guided by the teacher.
- 3 Independent Practice** – practice on your own. Once children have mastered the concept they use their reasoning and problem-solving skills to develop their depth of learning.

Resources



Planning for lessons will primarily come from Maths No Problem! Teachers' Guide found at <https://hub.mathsnoproblem.com/teacher-guides/england>

However, supplementary documents are available for teachers to use in their planning. These include the White Rose Scheme of Work, including IWB resources and Reasoning and Problem-Solving resources.



Teachers' subject knowledge is key to successful teaching for mastery, as well as their understanding of the learning steps required, and the order of those steps. The NCETM have designed materials to assist in the professional development of staff and enable them to deliver teaching for mastery with confidence. The NCETM have split the curriculum up into a small number of areas, called 'spines'

Spine 1: *Number, Addition and Subtraction*

Spine 2: *Multiplication and Division*

Spine 3: *Fractions.*

An explanation of the structure of these materials, with guidance on how teachers can use them, is contained in a **Getting Started** video. The materials can support teachers to develop their subject and pedagogical knowledge and so help to improve mathematics teaching in combination with the MNP! resources.

Journaling



Journaling can be a very effective tool to develop communication. Journaling can be incorporated into many parts of the maths lesson, depending on the type of entry, for example, to open a class with an investigative entry to engage students; consolidate learning and reflect on thinking with a mid-lesson descriptive or evaluative entry; enrich students with a creative entry for early finishers or independent practice.

The benefit of journaling for the teacher is to provide a concrete formative assessment. By evaluating student responses, you can determine their readiness to handle a new task and check for understanding of concepts.

Pupils will be expected to make notes in their maths journals about their learning through the lesson and the unit of work being covered. The journals may include;

1. Investigative work: Students explore a new concept, solve a problem and make connections to prior learning.
2. Descriptive work: Students describe or explain a concept or mathematical vocabulary. This can be done using pictures, numbers and/or words.
3. Evaluative: Students argue for or against a strategy or solution to explain why they think an answer is right or wrong, explain their choice of strategies or justify the most efficient strategy.
4. Creative: Students write their own word problem or create their own number puzzle.

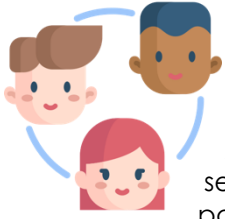
Reasoning Practise

Once Children are fluent in the skills taught, using the MNP textbooks and workbooks, they may then be given opportunities to apply these skills to additional Reasoning and Problem-Solving tasks planned by the class teacher (during the sequence of learning). There is a range of reasoning and problem-solving tasks for each year group saved in the maths folder in Staff Shared and include:

- Convince Me
- Dip and Pick
- I See Reasoning
- White Rose examples
- Discuss it
- What if
- Bar Model Activities



Maths Meetings



Maths Meetings are a vital part of the curriculum. Their purpose is to consolidate key areas of mathematics or introduce new topics in the class. To be most effective, it is recommended that Maths Meetings occur daily for 10–15 minutes outside the daily maths lesson. A Maths Meeting should cover several curricular areas, broken down into short segments; each segment should take approximately 2–3 minutes. Each meeting could start with a song, rhyme, poem or chant, to ensure full participation and enjoyment.

Maths Meetings should:

- Provide opportunities to develop number sense.
- Give students repeated practice of basic skills and concepts (fluency, consolidation, mastery of what has been taught)
- Be a whole-class ritual around the IWB
- Establish a routine for starting mathematical thinking in the day, building classroom culture, and making connections with mathematics in everyday life.

Maths Meetings expectations:


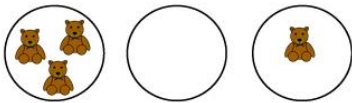


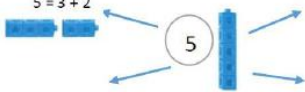



- 100% of the class must be ready to respond
- 100% of the class must look at and listen to the teacher
- Teacher only accepts appropriate responses, including technical vocabulary and full sentences when appropriate.

Teachers should plan their own Maths Meetings ensuring that a variety of mental maths strategies and skills are being taught:

- Counting forwards and backwards
- Reordering
- Partitioning: counting on or back
- Partitioning: bridging a multiple of 10
- Partitioning: compensating
- Partitioning: using 'near' doubles

The document: **Teaching Children to Calculate Mentally** gives lots of practical advice and guidance on teaching a variety of mental maths strategies and can be found in the Maths Planning Folder on the school drive.

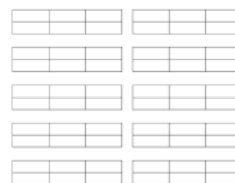
Year 1

Strand	Example questions
Number and Place Value <ul style="list-style-type: none"> Count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number. Count, read and write numbers to 100 in numerals; count in multiples of 2s, 5s and 10s. Given a number, identify 1 more and 1 less. Identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least. Read and write numbers from 1 to 20 in numerals and words. 	<p>1 How many red cubes and how many green cubes are there?</p>  <p>2 Match the teddies to the correct number.</p>  <p>0 1 3</p> <p>3 Use the picture to complete the sentences.</p>  <p>There are green cars. There are yellow cars. There are red cars.</p>
Addition and Subtraction <ul style="list-style-type: none"> Read, write and interpret mathematical statements involving addition (+), subtraction (−) and equals (=) signs. Represent and use number bonds and related subtraction facts within 20. Add and subtract one-digit and two-digit numbers to 20, including 0. Solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as $7 = ? - 9$ 	<p>1 Here are 5 cubes.</p>  <p>Break them apart in different ways to find all the number bonds to 5. One is done for you.</p> <p>$5 = 3 + 2$</p>  <p>2 Use seven double sided counters.</p> <p>How many different ways to make 7 can you find? Record your findings in number sentences.</p> <p>3 If 9 is the whole, what could the parts be?</p> <p>Show your findings in part whole models. Can you write an addition sentence for each part whole model?</p>
Multiplication and Division <ul style="list-style-type: none"> Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher. 	<p>1 How many birds are there altogether?</p>  <p>There are birds in each tree. There are trees. There are birds altogether.</p> <p>2 How many flowers are there altogether?</p>  <p>There are flowers in each bunch. There are bunches. There are flowers altogether.</p> <p>3 Use a 0-100 bead string to count in tens.</p> <p>Can we count forwards and backwards in tens? Can we count in tens on a number line as well? How does this match counting on a bead string?</p> 

Fractions (including decimals)

- Recognise, find and name a half as 1 of 2 equal parts of an object, shape or quantity.
- Recognise, find and name a quarter as 1 of 4 equal parts of an object, shape or quantity

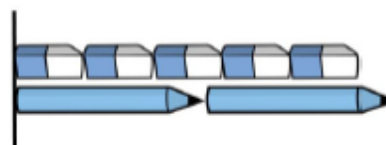
How many different ways can you shade one half of the shapes?



Measures

- Compare, describe and solve practical problems for:
 - lengths and heights [for example, long/short, longer/shorter, tall/short, double/half]
 - mass/weight [for example, heavy/light, heavier than, lighter than]
 - capacity and volume [for example, full/empty, more than, less than, half, half full, quarter]
 - time [for example, quicker, slower, earlier, later]
- Measure and begin to record the following:
 - lengths and heights
 - mass/weight
 - capacity and volume
 - time (hours, minutes, seconds)
 - recognise and know the value of different denominations of coins and notes
 - sequence events in chronological order using language [for example, before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening] .
- Recognise and use language relating to dates, including days of the week, weeks, months and years.
- Tell the time to the hour and half past the hour and draw the hands on a clock face to show these times.

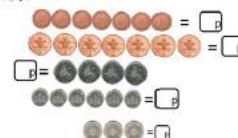
How many sentences can you write to compare the erasers and the pencils?



Using classroom equipment, can you find an object which is longer than your rubber but shorter than your pencil?

Can you find a friend who is shorter than you but taller than your other friend?

1 Count the money.



2 Use <, > or = to compare the coins.



3 Count the money.



Geometry - Properties of shape

- Recognise and name common 2-D and 3-D shapes, including:
 - 2-D shapes [for example, rectangles (including squares), circles and triangles]
 - 3-D shapes [for example, cuboids (including cubes), pyramids and spheres].

Geometry - Position and Movement

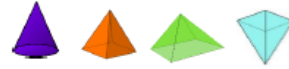
- Describe position, direction and movement, including whole, half, quarter and three-quarter turns.

1 Circle the odd one out in each group.

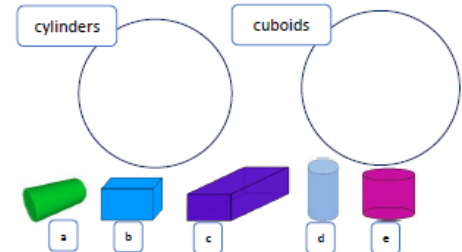
1.



2.



2 Place the shapes in the correct groups.



1 Use cones to mark out a route for a partner. Describe the route your partner needs to take using the words 'left' and 'right'.




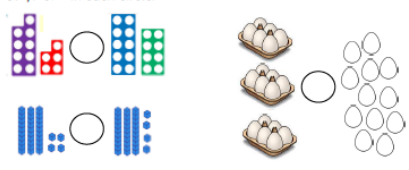


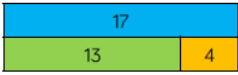
2 Use a grid to move a bot to different places. Use the words 'left', 'right', 'up' and 'down' to describe the movements.



3 Complete the stem sentences using 'left' and 'right' to describe the positions of the coins.



The £1 coin is to the _____ of the 1p coin.
The 50p coin is to the _____ of the 1p coin.
The 2p coin is to the _____ of the 50p coin.

Strand	Example questions
<p>Number and Place Value</p> <ul style="list-style-type: none"> Count in steps of 2, 3, and 5 from 0, and in tens from any number, forward and backward. Recognise the place value of each digit in a two-digit number (tens, ones). Identify, represent and estimate numbers using different representations, including the number line. Compare and order numbers from 0 up to 100; use and = signs. Read and write numbers to at least 100 in numerals and in words. Use place value and number facts to solve problems. 	<p>1 A packet of sweets contain 10 sweets.</p> <p>Helena's sweets Zak's sweets</p>  <p>Who has the most sweets?</p> <p>2 Use cubes to show that:</p> <ul style="list-style-type: none"> Eleven is less than fifteen. 19 is greater than 9. 2 tens is equal to 20. <p>3 Put < > or = in each circle.</p> 
<p>Addition and Subtraction</p> <ul style="list-style-type: none"> Solve problems with addition and subtraction: using concrete objects and pictorial representations, including those involving numbers, quantities and measures applying their increasing knowledge of mental and written methods. Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100. Add and subtract numbers using concrete objects, pictorial representations, and mentally, including: a two-digit number and ones, a two-digit number and tens, two two-digit numbers. Add three one-digit numbers. Show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot. Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems. 	<p>1 Using concrete apparatus, can you talk about the relationships between the different flowers?</p>  <p>2 One relationship shown by this part whole model is $15 + 5 = 20$ Can you write all associated fact facts in the sentences below?</p>  <p>3 Look at the bar model below. Can you write all of the sentences in the fact family?</p> 

Multiplication and Division

- Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers.
- Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (\times), division (\div) and equals (=) signs.
- Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot.
- Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.

- 1 How many petals altogether?



Write the calculation.

- 2 There are 35 fingers.
How many hands?

$\times 5 = 35$



- 3 Use $<$, $>$ or $=$ to make the statements correct.

2×5 5×2

3×2 4×5

10×5 5×5

Fractions

- Recognise, find, name and write fractions $1/2$, $1/3$, $1/4$, $2/4$, $3/4$ of a length, shape, set of objects or quantity.
- Write simple fractions for example, $1/2$ of 6 = 3 and recognise the equivalence of $2/4$ and $1/2$.

- 1 Four friends are sharing a cake.

The cake is split into equal parts.

Each part is worth a .

This is the same as .



- 2 Shade $\frac{1}{4}$ of each shape.



- 3 Circle the shapes that have a quarter shaded.



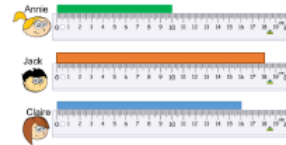
Which shapes do not have a quarter shaded? How do you know?

Can you draw the shapes again and split into quarters correctly?

Measures

- Choose and use appropriate standard units to estimate and measure length/height in any direction (m/cm); mass (kg/g); temperature ($^{\circ}\text{C}$); capacity (litres/ml) to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels.
- Compare and order lengths, mass, volume/capacity and record the results using $>$, $<$ and $=$.
- Recognise and use symbols for pounds (£) and pence (p); combine amounts to make a particular value
- Find different combinations of coins that equal the same amounts of money.
- Solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change.
- Compare and sequence intervals of time.
- Tell and write the time to five minutes, including quarter past/to the hour and draw the hands on a clock face to show these times.
- Know the number of minutes in an hour and the number of hours in a day.

- 1 Annie, Jack and Claire each have a piece of ribbon.



- How much longer is Jack's ribbon than Annie's?
- Jack and Claire put their ribbons together, how long are they altogether?
- Annie cuts three more ribbons to the same length as hers, what is the length of all four ribbons?

- 2 Ted has a toy train and a toy plane.
The train is 28 cm long. The plane is 16 cm longer.
How long is the plane?



A toy train is double the length of a toy car.
How long is the toy car?



Geometry – Properties of Shapes

- Identify and describe the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line.
- Identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces.
- Identify 2-D shapes on the surface of 3-D shapes, [for example, a circle on a cylinder and a triangle on a pyramid].
- Compare and sort common 2-D and 3-D shapes and everyday objects.

- 1 Sort these 2D shapes into the correct group:



- 2 Give children prepared groups of 2D shapes and labels. Match the labels to the groups and justify how they have been sorted. How are the shapes sorted?



- 3 Sophie sorted the shapes by the number of vertices. What shapes belong to each group?

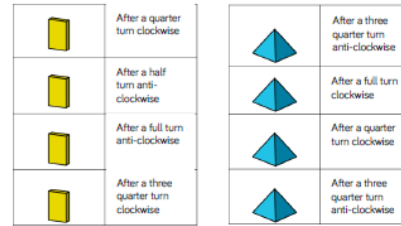
4 vertices	More than 4 vertices

Geometry – Position and Movement


- Order and arrange combinations of mathematical objects in patterns and sequences.
- Use mathematical vocabulary to describe position, direction and movement, including movement in a straight line and distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anticlockwise).


1 Using the words forwards, backwards, up, down, left and right, give your partner some instructions to complete around the classroom/playground.


2 Draw what the shape will look like once it has turned.



3 Describe how the triangle has turned each time.

 The triangle has made a _____ turn _____.

 The triangle has made a _____ turn _____.

 The triangle has made a _____ turn _____.

Statistics

- Interpret and construct simple pictograms, tally charts, block diagrams and simple tables.
- Ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity.
- Ask and answer questions about totalling and comparing categorical data.

1 Complete the pictogram.

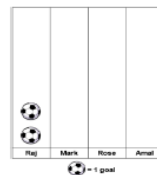
Hair colour		Number
Black	●●●●●	5
Blonde	●●●●●●●	7
Brown		9
Ginger	●●●●	4







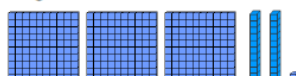
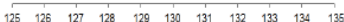

2 Use the tally chart to help you complete the pictogram.

Fruit	Tally	Fruit	Number
Kiwi		Banana	
Grapes		Grapes	
Pear		Pear	
Apple		Apple	

3 Complete the pictogram using the data given.

Name	Tally of goals scored
Raj	
Mark	
Rose	
Amal	



Strand	Example questions									
Number and Place Value <ul style="list-style-type: none">Count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number.Recognise the place value of each digit in a threedigit number (hundreds, tens, ones).Compare and order numbers up to 1000.Identify, represent and estimate numbers using different representations.Read and write numbers up to 1000 in numerals and in words.Solve number problems and practical problems involving these ideas.	<div><div>1 Put the correct number in each box.<div><div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div>10 less</div></div><div><div></div><div>Number</div></div><div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div>10 more</div></div></div></div><div><div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div>100 less</div></div><div><div></div><div>Number</div></div><div><div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div>100 more</div></div></div></div></div><div>2 Show ten more and ten less than the following numbers using Base 10 and place value counters.<ul style="list-style-type: none">550724302</div><div>3 Complete the table.<table><tr><th>100 less</th><th>Number</th><th>100 more</th></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr></table></div></div></div></div></div>	100 less	Number	100 more						
100 less	Number	100 more								
										
										
Addition and Subtraction <ul style="list-style-type: none">Add and subtract numbers mentally, including: a three-digit number and ones, a three-digit number and tens, a three-digit number and hundreds.Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction.Estimate the answer to a calculation and use inverse operations to check answers.Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction.	<div><div>1 Using Base 10 solve $321 - 4$<div></div></div><div>2 How could this part whole model help you solve $132 - 4$? Show me on a number line.<div><div><div>4</div><div>2</div><div>2</div></div><div></div></div></div><div>3 Red Team had 672 team points this year and won the House Cup. Blue Team finished second with 7 less points than the red team. How many points did the Blue team finish on?</div></div>									
Multiplication and Division <ul style="list-style-type: none">Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables.Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods.Solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects.	<div><div>1 Circle the buttons in groups of 4<div></div><div>Can you also split the buttons into 4 equal groups? How is it different? How is it the same?</div></div><div>2 There are some cars in a car park. Each car has 4 wheels. In the car park there are 32 wheels altogether. How many cars are there?</div><div>3 Complete the bar models and complete the calculations.<div><div><div>24</div><div></div><div></div><div></div><div></div></div><div><div>4</div><div>4</div><div>4</div><div>4</div><div>4</div><div>4</div></div></div><div><div>$24 \div 4 = \square$</div><div>$\square \div 4 = \square$</div></div></div></div>									

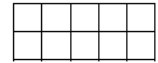
Fractions and Decimals

- Count up and down in tenths; recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10.
- Recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators.
- Recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators.
- Recognise and show, using diagrams, equivalent fractions with small denominator.
- Add and subtract fractions with the same denominator within one whole [for example, $5/7 + 1/7 = 6/7$].
- Compare and order unit fractions, and fractions with the same denominators.
- Solve problems that involve all of the above.

- 1 If the frame represents 1 whole, what does each box represent?

Use counters to represent:

- One tenth
- Two tenths
- Three tenths
- One tenth less than eight tenths



- 2 The counting stick is worth 1 whole. Label each part of the counting stick.



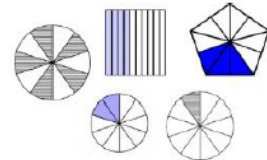
- 3 Identify what fraction of each shape is shaded. Give your answer in words and as a fraction.

E.g.



Three tenths

$$\frac{3}{10}$$



Measures

- Measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml).
- Measure the perimeter of simple 2-D shapes.
- Add and subtract amounts of money to give change, using both £ and p in practical contexts.
- Tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks.
- Estimate and read time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes and hours; use vocabulary such as o'clock, a.m./p.m., morning, afternoon, noon and midnight.
- Know the number of seconds in a minute and the number of days in each month, year and leap year.
- Compare durations of events [for example to calculate the time taken by particular events or tasks].

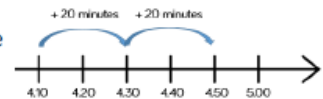
- 1 Practice finding start/end times by moving hands on a clock. For example, If playtime starts at five past ten and lasts for 20 minutes, what time will playtime end? An hour maths lesson finishes at 10.15. What time does the lesson start?

2



A 40 minute TV programme starts at the time shown. What time does it finish?

We can use a number line to work out the end time.



Use this method to work out:

- The end time of a 25 minute lesson starting at 2.15 p.m.
- The start time if a 1 hour 10 minute journey ended at 4 o'clock.

3

Which activity ends the latest?

Gymnastics starts at **15.30** and lasts 1 hour 15 minutes

Football starts at **16.05** and lasts 45 minutes.

Geometry – Properties of Shape

- Draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them.
- Recognise angles as a property of shape or a description of a turn.
- Identify right angles, recognise that two right angles make a half-turn, three make three quarters of a turn and four a complete turn; identify whether angles are greater than or less than a right angle.
- Identify horizontal and vertical lines and pairs of perpendicular and parallel lines.

1



The angle between the hands is _____ than a right angle.
This is called an _____ angle.



The angle between the hands is _____ than a right angle.
This is called an _____ angle.

Explore other times where the hands make an acute/obtuse angle.

2

Find and draw 3 acute angles and 3 obtuse angles you can see in your classroom. Use your 'Right Angle Tester' to check.



3

Label the angles in these images.



Geometry – Position and Movement

- Use mathematical vocabulary to describe position, direction and movement, including movement in a straight line and distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anticlockwise).

Statistics

- Interpret and present data using bar charts, pictograms and tables solve one-step and two-step questions [for example, 'How many more?' and 'How many fewer?'].
- Use information presented in scaled bar charts and pictograms and tables.

1

The table shows which sport children play.

	Lottie	John	Chris	Ann	Joanna	Jack
Football	✓		✓	✓		✓
Rugby			✓		✓	
Tennis	✓	✓		✓		✓
Cricket			✓		✓	
Basketball		✓	✓	✓		✓

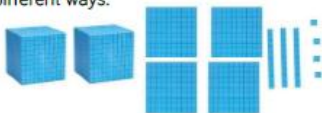
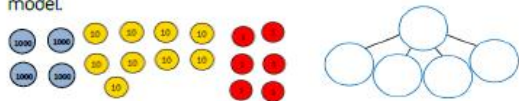
























Which children play football and tennis?
Which is the most popular sport?
Which is the least popular sport?
Who plays the most sport?

2

The table shows the increase of bus ticket fares.

1 st January	
2016	2017
44p	49p
56p	60p
64p	69p
76p	85p
85p	95p
98p	£1.03
£1.05	£1.11

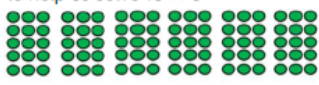
- The cost of Joel's new ticket is 85p. How much has his fare increased be?
- What was the largest increase in price of any ticket?
- What was the smallest increase in price of any ticket?

Strand	Example questions												
Number and Place Value <ul style="list-style-type: none">Count in multiples of 6, 7, 9, 25 and 1000 find 1000 more or less than a given number.Count backwards through zero to include negative numbers.Recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones).Order and compare numbers beyond 1000.Identify, represent and estimate numbers using different representations.Round any number to the nearest 10, 100 or 1000.Solve number and practical problems that involve all of the above and with increasingly large positive numbers.Read Roman numerals to 100 (I to C) and know that over time, the numeral system changed to include the concept of zero and place value.	<p>1 Move the Base 10 around and make exchanges to represent the number in different ways.</p>  $\begin{array}{r} 2000 + 400 + \square + 4 \\ 1000 + \square + \square + 14 \\ 1000 + 1300 + \square + \square \end{array}$ <p>2 Represent the number in two different ways in a part whole model.</p>  <p>3 Lily describes a number. She says, "My number has 4 thousands and 301 ones" What is Lily's number? Can you describe it in a different way?</p>												
Addition and Subtraction <ul style="list-style-type: none">Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate.Estimate and use inverse operations to check answers to a calculation.Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why.	<p>1 Add the place value counters together.</p> <table border="1" data-bbox="969 976 1315 1050"><thead><tr><th>1,000s</th><th>100s</th><th>10s</th><th>1s</th></tr></thead><tbody><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr></tbody></table> <p>Can you write this as a calculation? (3,242 + 2,213) Now complete the question 3,242 + 213 in the same way. What is the same and what's different? Look at how the place value columns are lined up in the new question. How is our answer different? Why?</p> <p>2 Complete the missing numbers.</p> $\begin{array}{r} 4\square 6\square \\ + 25\square 1 \\ \hline \square 789 \end{array}$	1,000s	100s	10s	1s								
1,000s	100s	10s	1s										
													
													

Multiplication and Division

- Recall multiplication and division facts for multiplication tables up to 12×12 .
- Use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers.
- Recognise and use factor pairs and commutativity in mental calculations.
- Multiply two-digit and three-digit numbers by a one digit number using formal written layout.
- Solve problems involving multiplying and adding, including using the distributive law to multiply two-digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects.

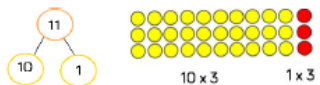
1 We can use our knowledge of factors to help us solve 15×6



$$\begin{array}{r} 15 \times 6 \\ 3 \times 5 \times 6 \end{array}$$

We have ____ lots of ____ \times ____
 The question becomes $3 \times 5 \times 6$
 How could you use this to help you work out the answer?

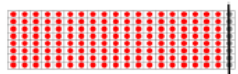
2 11×3



Ten lots of 3 = ____ One lot of 3 = ____
 Eleven lots of 3 = ____
 $11 \times 3 = ___ \times 3 + ___ \times 3$
 $___ \times 3 + ___ \times 3 = 11 \times 3$

Use this method to solve:
 21×5 31×6 7×22

3 $19 \times 8 = 20 \times 8 - 1 \times 8$



How could we use this method to solve 29×8 ?
 Use this method to solve 19×4 , 39×7 , 48×4

Fractions and Decimals

- Recognise and show, using diagrams, families of common equivalent fractions count up and down in hundredths; recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten.
- Solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number.
- Add and subtract fractions with the same denominator.
- Recognise and write decimal equivalents of any number of tenths or hundredths.
- Recognise and write decimal equivalents to $1/4$, $1/2$, $3/4$.
- Find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths.
- Round decimals with one decimal place to the nearest whole number.
- Compare numbers with the same number of decimal places up to two decimal places.
- Solve simple measure and money problems involving fractions and decimals to two decimal places.

1 Use cubes, strips of paper or a bar model to solve:

$$\frac{9}{9} - \frac{4}{9} = \frac{\square}{9} \qquad \frac{9}{9} - \frac{\square}{9} = \frac{2}{9} \qquad \frac{13}{9} - \frac{9}{9} = \frac{\square}{9}$$

What's the same? What's different?

Use cubes to build a model to show $3 - \frac{5}{9} = 2 \frac{4}{9}$

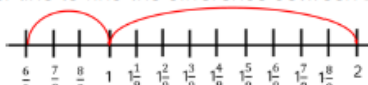


Could you build the cubes in a tower to subtract?

2 Use cubes to calculate:

$$2 - \frac{3}{4} \qquad 3 - \frac{3}{7} \qquad 3 - \frac{\square}{8} = 1 \frac{3}{8} \qquad \frac{\square}{9} - \frac{4}{5} = 1 \frac{3}{5}$$

3 Charlie uses a number line to find the difference between 2 and $\frac{6}{9}$



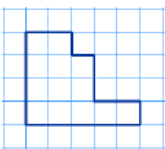
Use a number line to find the difference between:

$$2 \text{ and } \frac{2}{3} \qquad 2 \text{ and } \frac{2}{11} \qquad 2 \text{ and } \frac{2}{7}$$

Measures

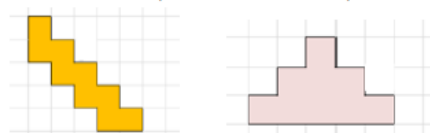
- Convert between different units of measure [for example, kilometre to metre; hour to minute].
- Measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres.
- Find the area of rectilinear shapes by counting squares.
- Estimate, compare and calculate different measures, including money in pounds and pence.
- Read, write and convert time between analogue and digital 12- and 24-hour clocks.
- Solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days.

1 Work out the perimeter of the shape. Can you draw a different shape with :
a) the same perimeter
b) a perimeter which is 5cm longer
c) a perimeter which is double/half the length of this one.



2 Using squared paper draw two rectilinear shapes, each with a perimeter of 28cm
What's the same and what's different about these shapes?

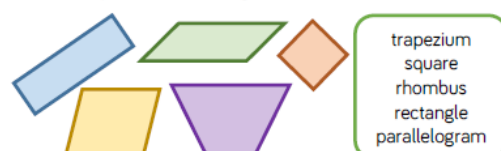
3 Draw and find the perimeter of these shapes in cm.



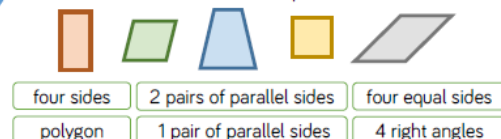
Geometry – Properties of Shape

- Compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes.
- Identify acute and obtuse angles and compare and order angles up to two right angles by size.
- Identify lines of symmetry in 2-D shapes presented in different orientations.
- Complete a simple symmetric figure with respect to a specific line of symmetry.

1 Label the quadrilaterals using the word bank.



2 Use the criteria to describe the shapes.



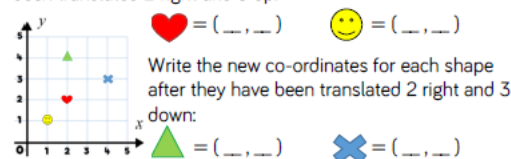
Which criteria can be used more than once?
Which shapes share the same criteria?
Can you add any more properties to the shapes?

3 Draw and label;
• a rhombus. • a parallelogram. • 3 different trapeziums

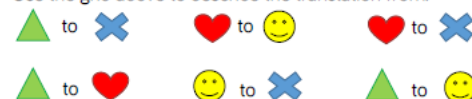
Geometry – Position and Movement

- Describe positions on a 2-D grid as coordinates in the first quadrant.
- Describe movements between positions as translations of a given unit to the left/right and up/down.
- Plot specified points and draw sides to complete a given polygon.

Write the new co-ordinates for each shape after they have been translated 2 right and 3 up:



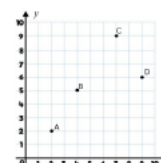
Use the grid above to describe the translation from:



Describe the translation from:

A to B B to C C to D D to A

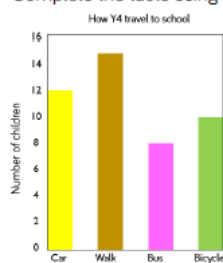
Plot points E, F and G and describe the translations from A to your new points, then from B.



Statistics

- Interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs.
- Solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs.

Complete the table using the information in the bar chart.



Transport	Number of children
Car	
Walk	
Bus	
Bicycle	

What is the most/least popular way to get to school?










How many children walk to school?

Produce your own table/bar chart/pictogram showing how the children in your class travel to school.

Represent the data in each table as a bar chart.















Day	Number of tickets sold
Monday	55
Tuesday	30
Wednesday	45
Thursday	75
Friday	85

Strand	Example questions																																				
<p>Number and Place Value</p> <ul style="list-style-type: none">Read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000.Interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero.Round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000.Solve number problems and practical problems that involve all of the above.Read Roman numerals to 1000 (M) and recognise years written in Roman numerals.	<p>1 Match the diagram to the number.</p> <div></div> <div><div>4,005</div><div>4,500</div><div>4,050</div></div> <p>2 Which diagram is the odd one out?</p> <div></div> <div></div> <p>3 Complete the table.</p> <table><tr><th></th><th>Add 10</th><th>Add 100</th><th>Add 1,000</th></tr><tr><td>2,506</td><td></td><td></td><td></td></tr><tr><td>7,999</td><td></td><td></td><td></td></tr><tr><td></td><td></td><td>6,070</td><td></td></tr></table>		Add 10	Add 100	Add 1,000	2,506				7,999						6,070																					
	Add 10	Add 100	Add 1,000																																		
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<p>Addition and Subtraction</p> <ul style="list-style-type: none">Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction).Add and subtract numbers mentally with increasingly large numbers.Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy.Solve addition and subtraction multistep problems in contexts, deciding which operations and methods to use and why.	<p>When Claire opened her book, she saw two numbered pages. The sum of these two pages was 317. What would the next page number be?</p> <p>Adam is twice as old as Barry. Charlie is 3 years younger than Barry. The sum of all their ages is 53. How old is Barry?</p> <p>Solve the following. Find two examples for each bar model.</p> <div><table><tr><td>8547</td></tr><tr><td>?</td></tr><tr><td>?</td></tr></table><table><tr><td>8547</td></tr><tr><td>?</td></tr><tr><td>?</td></tr><tr><td>?</td></tr></table><table><tr><td>8547</td></tr><tr><td>?</td></tr><tr><td>?</td></tr><tr><td>?</td></tr><tr><td>?</td></tr></table></div> <div><table><tr><td>4869</td></tr><tr><td>?</td></tr><tr><td>?</td></tr><tr><td>?</td></tr></table><table><tr><td>4000</td><td>1217</td><td>1387</td><td>430</td><td>1892</td></tr><tr><td></td><td>1482</td><td>350</td><td></td><td>714</td></tr><tr><td>519</td><td>155</td><td>439</td><td>925</td><td></td></tr><tr><td>3000</td><td>944</td><td>1760</td><td>2000</td><td></td></tr></table></div>	8547	?	?	8547	?	?	?	8547	?	?	?	?	4869	?	?	?	4000	1217	1387	430	1892		1482	350		714	519	155	439	925		3000	944	1760	2000	
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Multiplication and Division





- Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers.
- Know and use the vocabulary of prime numbers, prime factors and composite (nonprime) numbers.
- Establish whether a number up to 100 is prime & recall prime numbers up to 19.
- Multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers.
- Multiply and divide numbers mentally drawing upon known facts.
- Divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context
- Multiply and divide whole numbers and those involving decimals by 10, 100 & 1000.
- Recognise and use square numbers and cube numbers, and the notation for squared (2) and cubed (3).
- Solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes.
- Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign.
- Solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates.





Use Base 10 to solve 32×24 , 25×31 , 34×23
Sammy adapts the Base 10 method to solve 44×32

Step 1 – build the length and the width using the multiplication calculation	Step 2 – Multiply the length by the width	Step 3 – Find the total of your ones																											
$44 \times 32 =$ <table border="1"> <tr> <td></td><td>40</td><td>4</td></tr> <tr> <td>30</td><td></td><td></td></tr> <tr> <td>2</td><td></td><td></td></tr> </table>		40	4	30			2			$44 \times 32 =$ <table border="1"> <tr> <td></td><td>40</td><td>4</td></tr> <tr> <td>30</td><td></td><td></td></tr> <tr> <td>2</td><td></td><td></td></tr> </table>		40	4	30			2			$44 \times 32 =$ <table border="1"> <tr> <td></td><td>40</td><td>4</td></tr> <tr> <td>30</td><td>1200</td><td>120</td></tr> <tr> <td>2</td><td>80</td><td>8</td></tr> </table> <div style="text-align: right;"> 1200 120 + 80 + 8 1408 </div>		40	4	30	1200	120	2	80	8
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	40	4																											
30	1200	120																											
2	80	8																											

Use place value counters and a grid to solve
 45×42 , 52×24 , 34×43

Here is a method to solve 4,892 divided by 4 using place value counters and short division.

Th	H	T	O
			

Th	H	T	O
			

$4 \overline{) 4892}$
 1223

Use this method to solve the following questions.

$6,610 \div 5$ $2,472 \div 3$ $9,360 \div 4$

Mr Porter has saved £8,934 pounds.
He shares it between his three grandchildren.
How much does each grandchild receive?

Use $<$ $>$ or $=$ to compare the statements

$3,495 \div 5$ $3,495 \div 3$

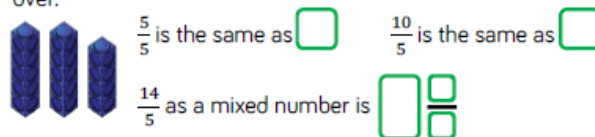
$8,064 \div 7$ $9,198 \div 9$

$7,428 \div 4$ $5,685 \div 5$

Fractions, Decimals and Percentages

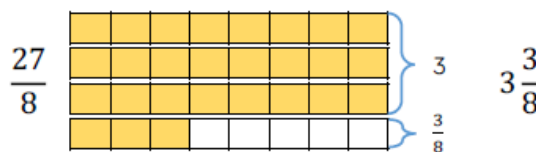
- Compare and order fractions whose denominators are all multiples of the same number.
- Identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths.
- Recognise mixed numbers and improper fractions and convert from one form to the other & write mathematical statements > 1 as a mixed number [$2/5 + 4/5 = 6/5 = 1 \frac{1}{5}$].
- Add and subtract fractions with the same denominator and denominators that are multiples of the same number.
- Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams.
- Read and write decimal numbers as fractions [for example, $0.71 = 71/100$].
- Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents.
- Round decimals with two decimal places to the nearest whole number and to one decimal place.
- Read, write, order & compare numbers with up to three decimal places.
- Solve problems involving number up to three decimal places.
- Recognise the percent symbol (%) and understand that percent relates to 'number of parts per hundred', write percentages as a fraction with denominator 100, & as a decimal.
- Solve problems which require knowing percent & decimal equivalents of $1/2$, $1/4$, $1/5$, $2/5$, $4/5$ and those fractions with a denominator of a multiple of 10 or 25.

Claire converts the improper fraction $\frac{14}{5}$ into a mixed number using cubes. She groups the cubes into 5s, then has 4 left over.



Use Claire's method to convert $\frac{19}{3}$, $\frac{19}{4}$, $\frac{19}{5}$ and $\frac{19}{6}$

Steve converts the improper fraction $\frac{27}{8}$ into a mixed number using bar models.



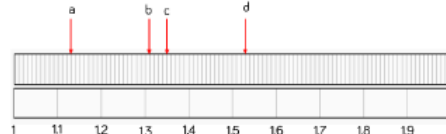
Use Steve's method to convert $\frac{38}{8}$, $\frac{27}{6}$, $\frac{47}{7}$ and $\frac{32}{4}$

Use the models to record equivalent decimals and fractions.

$0.3 = \frac{3}{10} = \frac{30}{100}$



Record the value of a, b, c and d as fraction and as a decimal.



Complete the table.

Pictorial Representation	Decimal	Decimal - expanded form	Fraction	Fraction - expanded form	In words
	3.24	$3 + 0.2 + 0.04$	$\frac{324}{100}$	$3 + \frac{2}{10} + \frac{4}{100}$	Three ones, two tenths and four hundredths
	3.01		$\frac{301}{100}$		
				$3 + \frac{5}{10} + \frac{2}{100}$	
					Two ones, three tenths and two hundredths

Measures

- Convert between different units of metric measure (for example, kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre & millilitre).
- Understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints.
- Measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres.
- Calculate and compare the area of rectangles (including squares), and including using standard units, square centimetres (cm^2) and square metres (m^2) and estimate the area of irregular shapes.
- Estimate volume [for example, using 1 cm^3 blocks to build cuboids (including cubes)] and capacity [for example, using water].
- Solve problems involving converting between units of time.
- Use all four operations to solve problems involving measure [for example, length, mass, volume, money] using decimal notation, including scaling.

Take 4 cm cubes. How many different solids can you make? What's the same? What's different?

Make these shapes.



Complete the table to describe your shapes.

Shape	Width	Height	Length	Volume (cm^3)
A				
B				
C				

Compare the capacity and the volume. Use the sentence stems to help you.

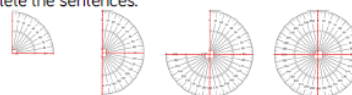


Container ____ has a capacity of ____ ml
The volume of juice in container ____ is ____ cm^3

Geometry – Properties of Shape

- Identify 3-D shapes, including cubes and other cuboids, from 2-D representations.
- Know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles.
- Draw given angles, and measure them in degrees ($^\circ$).
- Identify: angles at a point and one whole turn (total 360°) angles at a point on a straight line & $1/2$ a turn (total 180°) and other multiples of 90° .
- Use the properties of rectangles to deduce related facts and find missing lengths and angles distinguish between regular and irregular polygons based on reasoning about equal sides and angles.

Complete the sentences.

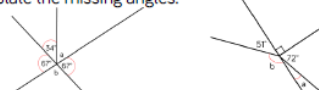


$\frac{1}{4}$ of a turn = 1 right angle = 90°
 $\frac{1}{2}$ of a turn = ____ right angles = ____ $^\circ$
____ of a turn = 3 right angles = ____ $^\circ$
A full turn = ____ right angles = ____

Calculate the missing angles.



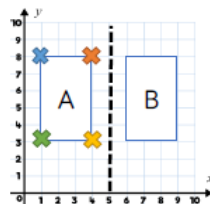
Calculate the missing angles.



Geometry – Position and Movement

- Identify, describe and represent the position of a shape following a reflection or translation, using the appropriate language, and know that the shape has not changed.

Shape A is reflected in the mirror line to position B.
Write the coordinates of the vertices for each shape.



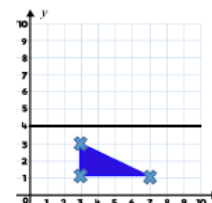
	Original Coordinate	Reflected Coordinate

Write the coordinates of the shape after it has been reflected in the mirror line.

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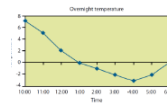
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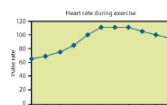
Statistics

- Solve comparison, sum and difference problems using information presented in a line graph.
- Complete, read and interpret information in tables, including timetables.

Use the line graph to answer the following questions.

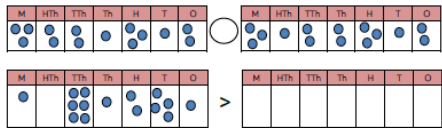
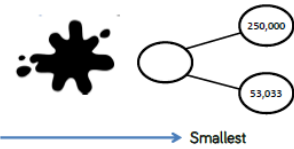
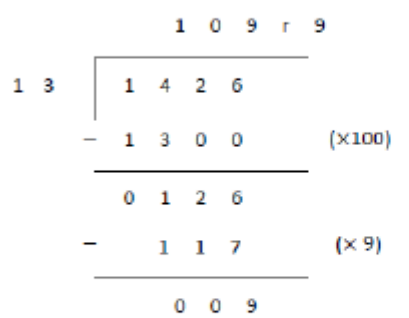


What was the highest/lowest temperature? What time did they occur?
What is the difference between the highest and lowest temperature?
How long did the temperature stay at freezing point or less?



How long did it take for the pulse rate to reach the highest level? Explain using the graph to help.
When do you think the person stopped exercising? Convince me.

Estimate what the pulse rate was after 2 and a half minutes.
How did you get an accurate estimate?

Strand	Example questions
<p>Number and Place Value</p> <ul style="list-style-type: none"> Read, write, order and compare numbers up to 10 000 000 and determine the value of each digit. Round any whole number to a required degree of accuracy. Use negative numbers in context, and calculate intervals across zero. Solve number and practical problems that involve all of the above. 	<p>Complete the statements to make them true.</p>  <p>What number could the splat be covering?</p> <p>Three hundred and thirteen thousand and thirty three</p>  <p>Greatest \longrightarrow Smallest</p> <p>A house costs £250,000. A motorised home costs £100,000. A bungalow is priced half way between the two. Work out the price of the bungalow.</p>
<p>Addition, Subtraction, Multiplication and Division</p> <ul style="list-style-type: none"> Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication. Divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context. Divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context. Perform mental calculations, including with mixed operations and large numbers. Identify common factors, common multiples and prime numbers. Use their knowledge of the order of operations to carry out calculations involving the four operations. Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why. 	<p>Simon used this method to calculate 1426 divided by 13. He wrote down his multiples key facts to help him work out the answer.</p>  <p>Using Simon's method answer the following:</p> <p>$2,637 \div 16 =$ $4,231 \div 22 =$ $4,203 \div 18 =$</p> <p>There are 7,849 people going to a concert. Each coach holds 64 people. How many coaches are needed to transport all the people?</p>

Fractions, Decimals and Percentages

- Use common factors to simplify fractions; use common multiples to express fractions in the same denomination.
- Compare and order fractions, including fractions > 1 .
- Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions.
- Multiply simple pairs of proper fractions, writing the answer in its simplest form. [For example, $\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$].
- Divide proper fractions by whole numbers. $\frac{1}{3} \div 2 = \frac{1}{6}$
- Associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [e.g. $\frac{3}{8}$].
- Identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places.
- Multiply one-digit numbers with up to two decimal places by whole numbers.
- Use written division methods in cases where the answer has up to two decimal places.
- Solve problems which require answers to be rounded to specified degrees of accuracy.
- Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.

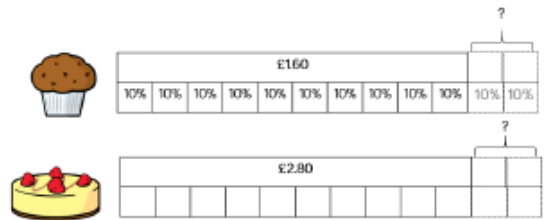
Use the place value counters to multiply 1.212 by 3
Complete the calculation alongside the concrete

Tens	Ones	Tenths	Hundredths	Thousandths
	1	0.1 0.1	0.01 0.01	0.001 0.001
	1	0.1 0.1	0.01 0.01	0.001 0.001
	1	0.1 0.1	0.01 0.01	0.001 0.001

A jar of sweets weighs 1.23 kg.
How much would 4 jars weigh?

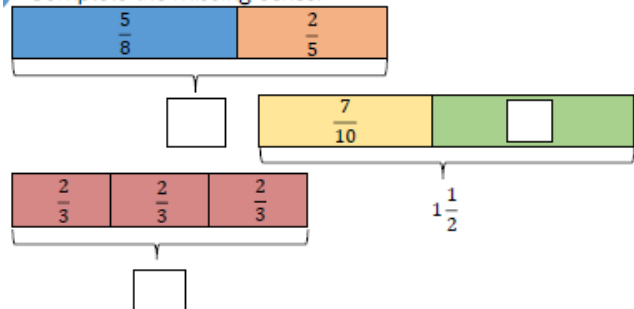


Janet is increasing the prices in her café by 20%
Calculate the percentage increase for the following items:



Use the same models to calculate the new cost for each item.

Complete the missing boxes.

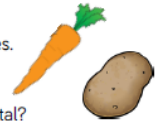


Jack had one quarter of a bag of sweets and Harry had two thirds of the sweets. They shared their sweets with Sophie. What fraction of the sweets do they all receive?

Ratio and Proportion

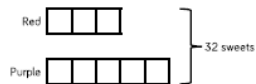
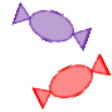
- Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts.
- Solve problems involving the calculation of percentages [for example, of measures, and such as 15% of 360] and the use of percentages for comparison.
- Solve problems involving similar shapes where the scale factor is known or can be found.
- Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples.

A farmer plants some crops in a field.
For every 12 carrots he plants 5 potatoes.
He plants 60 carrots in total.
How many potatoes did he plant?
How many vegetables did he plant in total?



Beth mixes 2 parts of red paint with 3 parts blue paint to make purple paint.
If she uses 12 parts blue paint, how much red paint did she use?

Emily has a packet of sweets.
For every 3 red sweets there are 5 purple sweets.
If there are 32 sweets in the packet in total, how many of each colour are there? You can use a bar model to help you.



Algebra

- Use simple formulae.
- Generate and describe linear number sequences.
- Express missing number problems algebraically.
- Find pairs of numbers that satisfy an equation with two unknowns.
- Enumerate possibilities of combinations of two variables.

If $\star = 7$ $\heartsuit = 5$ what is the value of:

$$\star + \heartsuit + \heartsuit$$

What is the same and what is different about this question?

If $a = 7$ and $b = 5$ what is the value of:

$$a + b + b$$

Substitute into the following expressions when,

$$w = 3 \quad x = 5 \quad y = 2.5$$

- | | |
|------------|---------------|
| • $w + 10$ | • $w + x + y$ |
| • $w + x$ | • $w - x - y$ |
| • $y - w$ | • $y + y + y$ |

Substitute into the following expressions when,

$$w = 10 \quad x = \frac{1}{4} \quad y = 2.5$$

- | | |
|--------|-----------------------|
| • $3y$ | • $12 + 8.8w$ |
| • wx | • $x \times (w + 2y)$ |

Measures

- Solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate.
- Use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation up to three decimal places.
- Convert between miles and kilometres.
- Recognise that shapes with the same areas can have different perimeters and vice versa.
- Recognise when it is possible to use formulae for area and volume of shapes.
- Calculate the area of parallelograms and triangles.
- Calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm³) and cubic metres (m³), and extending to other units [for example, mm³ and km³].

Choose the unit of measure that would be the most appropriate to measure the items.

cm kg km g tonnes ml mm litres

- The weight of an elephant
- The volume of water in a bath
- The length of an ant
- The length of a football pitch
- The weight of an apple

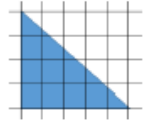
Estimate how much juice the glass holds:



250 ml 2 litres 0.5 litres $\frac{1}{2}$ kg

Calculate the area of the triangle by counting the squares. Make the triangle into a rectangle with the same height and width, and calculate the area of the rectangle.

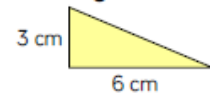
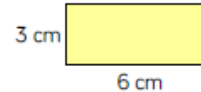
Complete: The area of the triangle is _____ the area of the rectangle.



If l represents length and h represents height:

$$\text{Area of a rectangle} = l \times h$$

Use this to calculate the area of the rectangle.



What do you need to do to your answer to work out the area of the triangle?

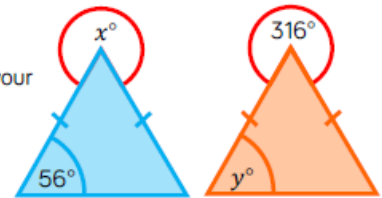
Therefore, what is the formula for the area of a triangle?

Geometry – Properties of Shape

- Draw 2-D shapes using given dimensions and angles.
- Recognise, describe and build simple 3-D shapes, including making nets.
- Compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons.
- Illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles.

Calculate the missing angles.

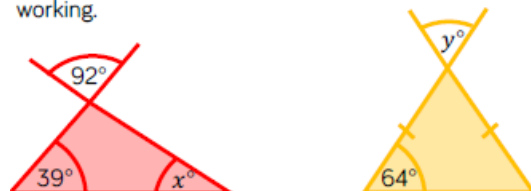
Explain each step of your working.



Calculate the missing angles. Explain each step of your working.



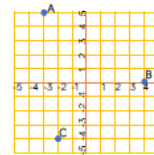
Calculate the missing angles. Explain each step of your working.



Geometry – Position and Movement

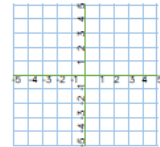
- Describe positions on the full coordinate grid (all four quadrants).
- Draw and translate simple shapes on the coordinate plane, and reflect them in the axes.

Emily plotted three co-ordinates.
Work out the co-ordinates of A, B and C.

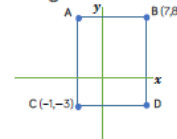


Draw the shape with the following co-ordinates $(-2, 2)$, $(-4, 2)$, $(-2, -3)$ and $(-4, -2)$.

What kind of shape have you drawn?



Work out the missing co-ordinates of the rectangle.

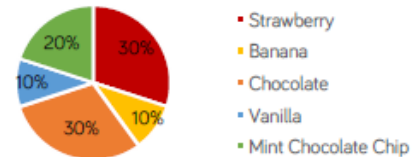


Statistics

- Interpret and construct pie charts and line graphs and use these to solve problems.
- Calculate and interpret the mean as an average.

150 children voted for their favourite ice cream flavours.
Here are their results:

Favourite Ice Cream Flavours



How many people voted for Vanilla?

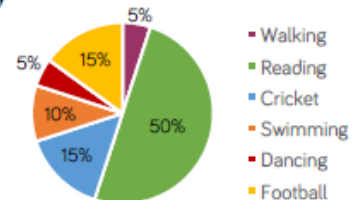
How many more people voted for Chocolate than Mint Chocolate chip?

How many people chose Chocolate, Banana and Vanilla altogether?

There are 200 pupils in Key Stage 2 who chose their favourite hobbies.

How many pupils chose each hobby?

KS2 Hobbies





Year Group: -		Unit:	
CPA	Stem Sentences	Misconceptions	
	<ul style="list-style-type: none">• What do you think?• How do you know?• Can you prove it?• Can you draw it?• Can you build it?• Can you explain it?• How many different ways can you find?		
Fluency	Vocabulary	Learning Steps	



Date:		Class:		Year:	
Mon	WALT:				
	Assessment:				
	MNP Lesson:				
	Differentiation:				
	Independent Practise:				
	Opportunities for journaling:				
	Challenge:				



Date:		Class:		Year:	
Tues	WALT:				
	Assessment:				
	MNP Lesson:				
	Differentiation:				
	Independent Practise:				
	Opportunities for journaling:				
	Challenge:				



Date:		Class:		Year:	
Wed	WALT:				
	Assessment:				
	MNP Lesson:				
	Differentiation:				
	Independent Practise:				
	Opportunities for journaling:				
	Challenge:				



Date:		Class:		Year:	
Thurs	WALT:				
	Assessment:				
	MNP Lesson:				
	Differentiation:				
	Independent Practise:				
	Opportunities for journaling:				
	Challenge:				



Date:		Class:		Year:	
Fri	WALT:				
	Assessment:				
	MNP Lesson:				
	Differentiation:				
	Independent Practise:				
	Opportunities for journaling:				
	Challenge:				



Date:		Class:		Year:	
Mon	WALT:				
	Assessment:				
	MNP Lesson:				
	Differentiation:				
	Independent Practise:				
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Date:		Class:		Year:	
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Date:		Class:		Year:	
Fri	WALT:				
	Assessment:				
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	Opportunities for journaling:				
	Challenge:				