Year 2

Mastery Overview
Spring

MathsHUBS White Rose

SOL Overview

As well as providing term by term overviews for the new National Curriculum, as a Maths Hub we are aiming to support primary schools by providing more detailed Schemes of Learning, which help teachers plan lessons on a day to day basis.

The following schemes provide exemplification for each of the objectives in our new term by term overviews, which are linked to the new National Curriculum. The schemes are broken down into fluency, reasoning and problem solving, which are the key aims of the curriculum. Each objective has with it examples of key questions, activities and resources that you can use in your classroom. These can be used in tandem with the mastery assessment materials that the NCETM have recently produced.

We hope you find them useful. If you have any comments about this document or have any suggestions please do get in touch.

Thank you for your continued support with all the work we are doing.

The White Rose Maths Hub Team

mathshub@trinityacademyhalifax.org

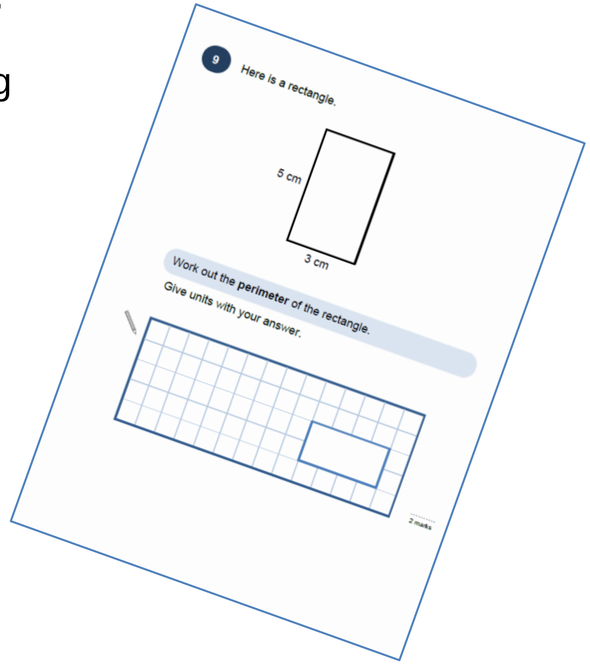
Assessment

Alongside these curriculum overviews, our aim is also to provide an assessment for each term's plan. Each assessment will be made up of two parts:

Part 1: Fluency based arithmetic practice
Part 2: Reasoning based questions

You can use these assessments to determine gaps in your students' knowledge and use them to plan support and intervention strategies.

The autumn and spring Assessments are now available.



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Teaching for Mastery

These overviews are designed to support a mastery approach to teaching and learning and have been designed to support the aims and objectives of the new National Curriculum.

The overviews:

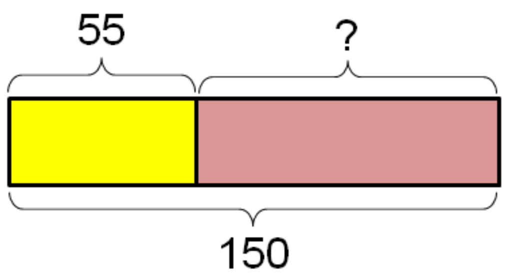
- have number at their heart. A large proportion of time is spent reinforcing number to build competency.
- ensure teachers stay in the required key stage and support the ideal of depth before breadth.
- ensure students have the opportunity to stay together as they work through the schemes as a whole group.
- provide plenty of time to build reasoning and problem solving elements into the curriculum.

Concrete – Pictorial – Abstract

As a hub we believe that all students, when introduced to a key new concept, should have the opportunity to build competency in this topic by taking this approach.

Concrete – students should have the opportunity to use concrete objects and manipulatives to help them understand what they are doing.

Pictorial – students should then build on this concrete approach by using pictorial representations. These representations can then be used to reason and solve problems.



An example of a bar modelling diagram used to solve problems.

Abstract – with the foundations firmly laid, students should be able to move to an abstract approach using numbers and key concepts with confidence.

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Frequently Asked Questions

We have bought one of the new Singapore textbooks. Can we use these curriculum plans?

Many schools are starting to make use of a mastery textbook used in Singapore and China, the schemes have been designed to work alongside these textbooks. There are some variations in sequencing, but this should not cause a large number of issues.

If we spend so much time on number work, how can we cover the rest of the curriculum?

Students who have an excellent grasp of number make better mathematicians. Spending longer on mastering key topics will build a student's confidence and help secure understanding. This should mean that less time will need to be spent on other topics.

In addition schools that have been using these schemes already have used other subjects and topic time to teach and consolidate other areas of the mathematics curriculum.

My students have completed the assessment but they have not done well.

This is your call as a school, however our recommendation is that you would spend some time with the whole group focussing on the areas of the curriculum that they do not appear to have grasped. If a couple of students have done well then these could be given rich tasks and deeper problems to build an even deeper understanding.

Can we really move straight to this curriculum plan if our students already have so many gaps in knowledge?

The simple answer is yes. You might have to pick the correct starting point for your groups. This might not be in the relevant year group and you may have to do some consolidation work before.

These schemes work incredibly well if they are introduced from Year 1 and continued into Year 2, then into Year 3 and so on.

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NCETM Mastery Booklets

In addition to the schemes attached the NCETM have developed a fantastic series of problems, tasks and activities that can be used to support 'Teaching for Mastery'. They have been written by experts in mathematics.

It will also give you a detailed idea of what it means to take a mastery approach across your school.

Information can be found on the link below.

https://www.ncetm.org.uk/resources/46689

Everyone Can Succeed

As a Maths Hub we believe that all students can succeed in mathematics. We do not believe that there are individuals who can do maths and those that cannot. A positive teacher mindset and strong subject knowledge are key to student success in mathematics.

More Information

If you would like more information on 'Teaching for Mastery' you can contact the White Rose Maths Hub at mathshub@trinityacademyhalifax.org

We are offering courses on:

- Bar Modelling
- Teaching for Mastery
- Year group subject specialism intensive courses – become a Maths expert.

Our monthly newsletter also contains the latest initiatives we are involved with. We are looking to improve maths across our area and on a wider scale by working with other Maths Hubs across the country.

Term by Term Objectives

Year 2

Year 2 Overview

<table>
<tr><th></th><th>Week 1</th><th>Week 2</th><th>Week 3</th><th>Week 4</th><th>Week 5</th><th>Week 6</th><th>Week 7</th><th>Week 8</th><th>Week 9</th><th>Week 10</th><th>Week 11</th><th>Week 12</th></tr>
<tr><th>Autumn</th><td colspan="2">Number: Place Value</td><td colspan="4">Number: Addition and Subtraction</td><td colspan="2">Measurement: Length and Mass</td><td>Graphs</td><td colspan="3">Multiplication and Division</td></tr>
<tr><th>Spring</th><td colspan="3">Measurement: Money</td><td colspan="3">Geometry: Properties of Shape</td><td colspan="4">Number: Fractions</td><td colspan="2"></td></tr>
<tr><th>Summer</th><td colspan="2">Measurement: Time</td><td colspan="2">Measurement: Capacity, Volume and Temperature</td><td colspan="8">Post SATs Project Work</td></tr>
</table>

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Term by Term Objectives

Year 2

Year Group	Y2	Term	Spring

Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
<u>Measurement: Money</u> Recognise and use symbols of 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.			<u>Geometry: Properties of Shape</u> Identify and describe the properties of 2D shapes, including the number of sides and line symmetry in a vertical line. Identify and describe the properties of 3D shapes, including the number of edges, vertices and faces. Identify 2D shapes on the surface of 3D shapes, [for example, a circle on a cylinder and a triangle on a pyramid]. Compare and sort common 2D and 3D shapes and everyday objects. 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 anti-clockwise)			<u>Number: Fractions</u> Recognise, find, name and write fractions $\frac{1}{3}, \frac{1}{4}, \frac{2}{4}$ and $\frac{3}{4}$ of a length, shape, set of objects or quantity. Write simple fractions for example, ½ of 6 = 3 Recognise the equivalence of $\frac{2}{4}$ and $\frac{1}{2}$.				Time at the beginning or end of the term for consolidation, gap filling, seasonal activities, assessments, etc.	

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Term by Term Objectives

Year 2

	National Curriculum Statement	All students		
		Fluency	**Reasoning**	**Problem Solving**
Measurement	Recognise and use symbols of pounds (£) and pence (p); combine amounts to make a particular value.	See Fluency below	See Reasoning below	See Problem Solving below

Fluency

- Here is a table of money that three people have in pounds and pence. Can you fill in the blank boxes?

Name	£	p	Total
Phil	4		£4.65
Sue	3	95	
Gary		115	£6.15

- Jackson went to the shop to buy milk and bread.

How much money does he need to pay without receiving any change?

- Tara has 2 ten pence coins, a five pence coin and a fifty pence coin. How much money does she have altogether?

Reasoning

- Anna has 3 silver coins in her hand. Larry says, "I have more than you because I have a £1 coin." Is he correct? Explain why.
- Always, sometimes, never.
  You can make £1 using an odd number of coins. Convince me!
- True or false

  5 copper coins can be worth more than 1 silver coin.

Problem Solving

- Jamie has 5 silver coins in his hand. How many different ways can he make £1 or more?
- Patrick visits an arcade. He has £5. He wants to go on at least 4 games.

Game	Price
Whack-a-rat	70p
Donkey Derby	90p
Bingo	£1
Grab-a-prize	50p
Dance mania	85p
Deal or no deal	£1.25

Which games can he go on? Will he have any change? Can you find more than one combination of games?

- How many ways can you make £1 using an unlimited amount of coins?

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Term by Term Objectives

Year 2

	National Curriculum Statement	All students		
		Fluency	Reasoning	Problem Solving
Measurement	Find different combinations of coins that equal the same amounts of money.	see below	see below	see below

Fluency

- Make 50p three ways using the coins below. You can use the coins more than once.

- I have £1.45. Can you find or draw the coins I could have to make this?
- Paul has £2 and Tony has £1.20. Which coins could Tony add to his pile to make his and Paul's amounts equal?

Reasoning

- Charanjot tells her friend Sam she has only silver coins in her hand. She says she has 43p. Sam thinks that's impossible. Do you agree with Sam? Explain why.
- True or false: 4 five pence coins are worth more than 2 ten pence coins. Explain why.

- Emily finds a 20p coin and thinks she now has enough for a ride on the ghost train. She puts it with her other three 20p coins. The ghost train costs £1. Is she correct? Explain why.

Problem Solving

- Hanna and Ste both claim to have 90p. Hanna has 3 coins and Ste has 4 coins. Are they correct? Which coins could they have?
- Emily has £3.40 and Katie has £2.20. How much does Emily need to give Katie so they have the same amount?
- Here is a price list. Jay has £2.20 What can he buy?

Item	Price
Chicken sandwich	£1
Ham sandwich	£1.50
Turkey sandwich	£1.20
Salad	30p
Jacket potato	£1
Panini	£1.30
Soup	£1.60
Sauce	10p
Can of pop	60p
Bun	60p
Chocolate bar	50p

Can you find a different set of items he can buy?

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Term by Term Objectives

Year 2

Measurement

National Curriculum Statement

Solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change.

All students

Fluency

- Benji spends £1.35 in the shop and pays with a £2 coin. How much change will he receive?
- Arun buys an ice lolly from the ice cream van. It costs 90p. He pays in 10 pence coins. How many 10 pence coins does he use?
- Fill in the missing box:

$\square$ + 40p = £1 – 30p

70p – 50p = 5p + $\square$

Reasoning

- True or false: you can make 51p using just 2 pence coins. Write an explanation with your answer.
- Alex has 90p. He bought a rubber for 30p and wants to buy a pencil.

The shopkeeper will not sell him the pencil. Can you explain why to Alex?

- Odd one out.
  Look at the coins below. Which one is the odd one out and why?

Problem Solving

- Marie went to the shop and spent 20p. She bought at least one of each sweet. Which item did she buy two of?

Munchy	2p
Sweetie	3p
Choccy bar	5p
Spotty eggs	7p

- Frankie bought candyfloss at a fayre. She paid with 6 coins. How much could the candyfloss have been? Which answer do you think is the most reasonable?
- Colin has 5 coins in his pocket. How much money might he have?

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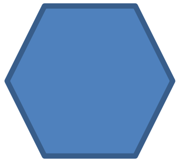
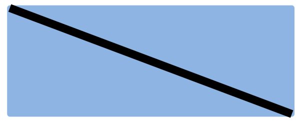
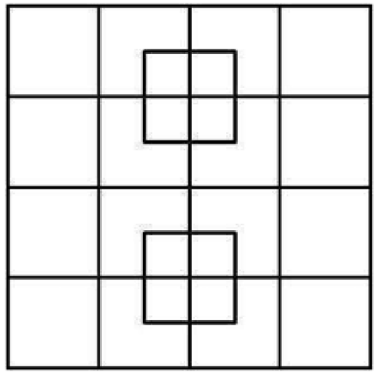
Term by Term Objectives

Year 2

	National Curriculum Statement	All students		
		Fluency	**Reasoning**	**Problem Solving**
Geometry	Identify and describe the properties of 2D shapes, including the number of sides and line symmetry in a vertical line.	• How many sides does an octagon have? • Count the sides of this shape and then name it.  • How many corners does a square have?	• Caroline is finding the properties of a shape. She thinks it is a square because it has four sides. Explain why she could be wrong. • Look at the line of symmetry in the shape below. Do you agree it is a line of symmetry? Explain why.  • I am thinking of a shape with more than two lines of symmetry. Prove which shape I am thinking of by using a pictorial image. Is that the only shape it could be?	• How many squares can you see in this picture?  • Draw a shape for a friend. How many lines of symmetry can they find? Can you now draw a shape with more lines of symmetry?

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Term by Term Objectives

Year 2

	National Curriculum Statement	All students		
		Fluency	Reasoning	Problem Solving
Geometry	Identify and describe the properties of 3D shapes, including the number of edges, vertices and faces.	• How many faces does a cube have? • What is my shape? I have 5 faces, 8 edges and 5 vertices. • What is the name given to 2 faces that meet?	• Katie is trying to build a tower with 3D shapes. When she uses one shape they keep rolling off each other. What shape do you think she is using and why? • Class 2 are using straws to make 3D shapes. Each child is given 12 straws to make a cuboid. Is this the right amount? Explain how you know. (Give children straws to use). • Jack says, "All 3D shapes have at least 1 vertex." Do you agree? Convince me.	• Look at the shapes on your table. Can you create a table/diagram to organise these shapes? How many different ways could they be sorted? • Put different shapes into a bag. In pairs, take turns to feel a shape, without looking, and describe it to your partner. Can they guess it? Record the clues you gave. • Three children have a 3D shape each. They are all different. They each give a fact about their shape. Aidan says, "My shape has 1 vertex." Anthony says, "My shape has less than 9 faces." Bevan says, "My shape has a triangle on one of their faces." List all the shapes they could each possibly have.

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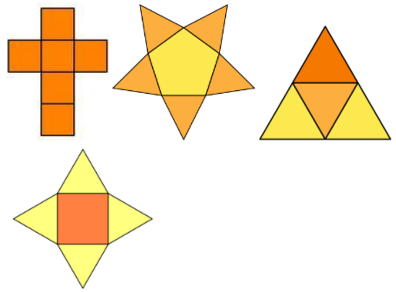
Term by Term Objectives

Year 2

	National Curriculum Statement	All students		
		Fluency	**Reasoning**	**Problem Solving**
Geometry	Identify 2D shapes on the surface of 3D shapes, [for example, a circle on a cylinder and a triangle on a pyramid].	• Which 2D shape makes 2 of the faces on a cylinder? • Fill in the missing number: A square based pyramid has ___ faces made from triangles. • Name a 3D shape that has a rectangle as one of their faces?	• I am thinking of a 3D shape. The faces are made up of triangles. What shape am I thinking of? • Saira is drawing all the 2D shapes she finds on 3D shapes. She draws 8 squares for a cube. Is she right? Prove it!	• Use the straws provided to create 3D shapes using the correct properties. What shapes do you notice on the faces? • Abigail is folding paper to make a 3D shape. Work out the shapes she has made by looking at her folded papers. 

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<table>
<tr><th rowspan="2"></th><th rowspan="2">National Curriculum Statement</th><th colspan="3">All students</th></tr>
<tr><th>Fluency</th><th>Reasoning</th><th>Problem Solving</th></tr>
<tr>
<td>Geometry</td>
<td>Compare and sort common 2D and 3D shapes and everyday objects.</td>
<td>Find 3 different 3D shapes in the classroom.
Sort the shapes on your tables into 2D and 3D.
What is my shape?
It is used in a game with two teams. It has only 1 face.</td>
<td>What’s the same about a cube and cuboid? What’s different?
Using the shapes on your table, sort them into different groups. Explain why you have organised them this way.
Find a 2D shape and a 3D shape in the classroom – could these objects have been designed better using a different shape e.g. would a clock look better as a square?</td>
<td>Shape hunt! Look around the school and playground. What shapes can you find?
Look at the diagram below.
<table>
<tr><th></th><th>3D</th><th>Not 3D</th></tr>
<tr><td>Has 1 or more curved sides/ faces</td><td></td><td></td></tr>
<tr><td>No curved sides/ faces</td><td></td><td></td></tr>
</table>
Sort the shapes on your table into this diagram.</td>
</tr>
</table>

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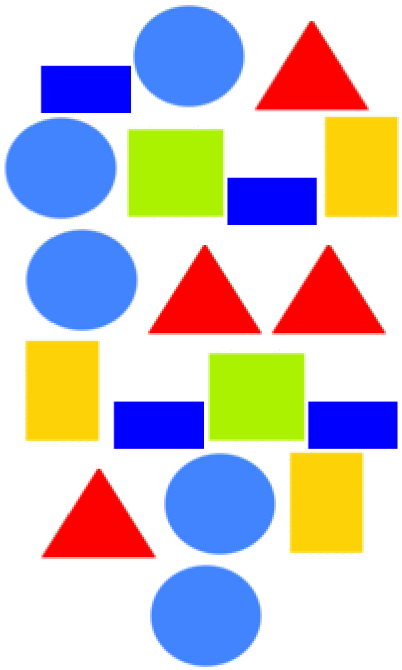
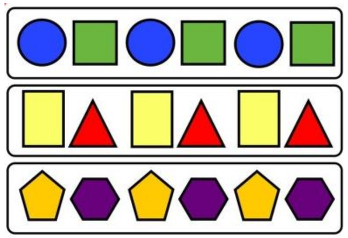
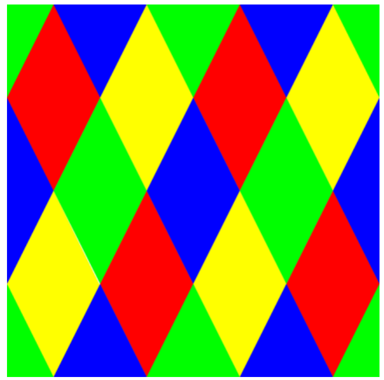
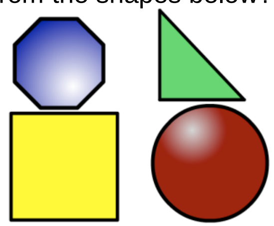
Term by Term Objectives

Year 2

	National Curriculum Statement	All students		
		Fluency	Reasoning	Problem Solving
Geometry	Order and arrange combinations of mathematical objects in patterns and sequences.	• Draw a pattern to show the following: red triangle, yellow square, blue circle. • Use the cubes to make a sequence. Can your partner continue it? • Create a pattern using only these shapes. 	• Jessie is making a pattern. It goes like this: red square, blue circle, green triangle. She thinks the 12th term will be a red square. Is she right? How do you know? • Spot and correct the mistake.  • What's the same and what's different about these patterns? 	• How many patterns can you see on this picture?  • How many different sequences can you make from the shapes below?  • Can you create a sequence for a partner?

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Term by Term Objectives

Year 2

<table>
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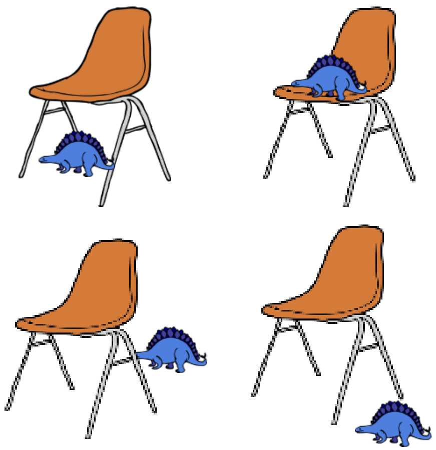
<tr><th>Fluency</th><th>Reasoning</th><th>Problem Solving</th></tr>
<tr>
<td>Geometry</td>
<td>Use mathematical vocabulary to describe position, direction and movement, including movement in a straight line and distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anti-clockwise)</td>
<td>

- Describe the position of the dinosaur in each picture.

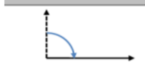
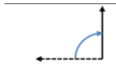
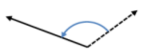


- Here is a ladybird.

Describe the turn that the ladybird has made in each image.

Can you describe the turn in more than one way?
</td>
<td>

- Decide whether the statements are true or false.
Explain your answers.

<table>
<tr><th>Picture</th><th>Statement</th><th>T or F?</th></tr>
<tr><td></td><td>Quarter turn</td><td></td></tr>
<tr><td></td><td>Half turn</td><td></td></tr>
<tr><td></td><td>Three quarter turn</td><td></td></tr>
<tr><td></td><td>Three quarter turn</td><td></td></tr>
<tr><td></td><td>Quarter turn</td><td></td></tr>
<tr><td></td><td>Half turn</td><td></td></tr>
</table>

- Always, sometimes, never.

A quarter turn clockwise is the same as a three quarter turn anti clockwise.

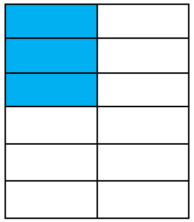
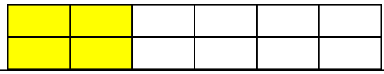
Explain your answer.
</td>
<td>

- Use a Roamer to draw a rectangle on a large piece of paper.
Which directions will you need to use?
Will you turn clockwise or anti clockwise?
Which other shapes can you draw using a roamer?

- Create a path to follow in the hall or outside.
In pairs, children start at the start of the path.
One of the children is blindfolded, the other is the guider.
Using the instructions, forward, backwards, left, right, quarter turn, half turn, clockwise and anticlockwise, can the children guide each other along the path?
Challenge the children to see if they can improve their times. Who gave the clearest instructions?
Were they the quickest?
</td>
</tr>
</table>

Term by Term Objectives

Year 2

	National Curriculum Statement	All students		
		Fluency	Reasoning	Problem Solving
Fractions	Recognise, find, name and write fractions $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{4}$ and $\frac{3}{4}$ of a length, shape, set of objects or quantity.	• What fraction of the shape below is shaded?  • Pat is organising her teddy bears. She donates $\frac{1}{4}$ of them to charity. How many bears did she have left?  • Circle the shape showing $\frac{1}{4}$  	• Circle the odd one out. Explain why you have chosen this fraction. $\frac{1}{4}$ $\frac{1}{3}$ $\frac{2}{4}$ $\frac{1}{2}$ • Four children want an equal share of this paper signed by a famous singer.  Explain how they can do it. • Amy is picturing two fractions. She says, "I think $\frac{1}{4}$ will be bigger than $\frac{1}{2}$ because 4 is bigger than 2." Draw these fractions to prove her wrong.	• Find fractions all around you. Write and illustrate them in your journal e.g.  The food filled $\frac{1}{2}$ of the plate. • Look at 20 toy cars. Is it possible to find $\frac{1}{2}$ $\frac{1}{3}$ $\frac{1}{4}$ of them without breaking any of them? • Use 3 circles, colour them in so they show $\frac{1}{4}$ $\frac{2}{4}$ and $\frac{3}{4}$. Write a sentence to explain what you notice. Now colour 3 circles and colour them in so they show $\frac{1}{2}$ $\frac{1}{3}$ and $\frac{1}{4}$ Write a sentence to explain what you notice. What is the difference between the first set of circles and the second set of circles?

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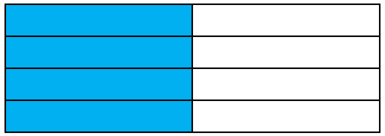
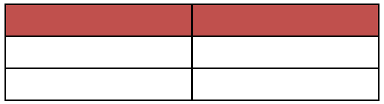
Term by Term Objectives

Year 2

	National Curriculum Statement	All students		
		Fluency	**Reasoning**	**Problem Solving**
Fractions	Write simple fractions for example, $\frac{1}{2}$ of 6 = 3	• Find $\frac{1}{3}$ of 30. • Fill in the boxes: $\frac{1}{2}$ of 6 = $\square$ $\frac{1}{\square}$ of 12 = 3 $\frac{2}{4}$ of $\square$ = 4 • Write a simple fraction sentence for the space shaded below. 	• Here is what is left of a pizza that Byron ate.  If he had another equal piece to this left, he would have $\frac{1}{2}$ of the original pizza. How much did he eat? Explain how you know. • Bill is asked to shade a half of his shape. This is what he shades.  Is he correct? Explain why. • Jessie is writing simple fraction sentences. She says, "I know $\frac{1}{2}$ of 8 is 4 so $\frac{1}{4}$ of 8 is 8." Explain the mistake Jessie has made.	• Look at the toy cars. Write as many different fraction sentences as you can e.g. $\frac{1}{2}$ of 20 = 10. • Look at the picture below. How many fraction sentences can you write? e.g. 1/3 of the stars are blue. 

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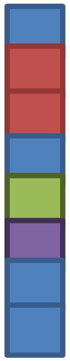
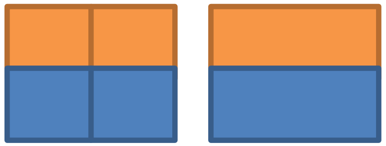
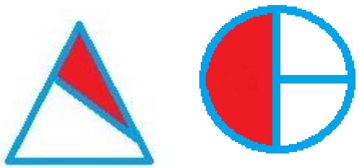
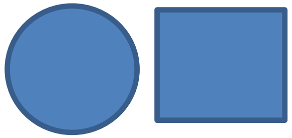
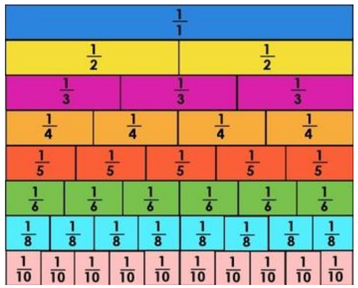
Year 2

	National Curriculum Statement	All students		
		Fluency	**Reasoning**	**Problem Solving**
Fractions	Recognise the equivalence of $\frac{1}{2}$ and $\frac{2}{4}$.	• $\frac{2}{4}$ of this tower is blue. How else can we describe this?  • What fraction of these shapes are shaded orange?  • What is $\frac{2}{4}$ equivalent to?	• Mihal receives $\frac{1}{2}$ of £10. Violet gets $\frac{2}{4}$ of it. How much money is left? Explain why. • Tick the shapes that are showing $\frac{1}{2}$ or $\frac{2}{4}$ are shaded. Explain how you know.  • Gareth and Stacey both have the same sized chocolate bar. Gareth eats 1 piece of his. Stacey eats 2 equal pieces of hers. They eat the same amount of chocolate. Can you explain how you know this is true?	• Take different shaped paper e.g.  Ask the children to fold them and colour them in different colours to show $\frac{1}{2}$ and $\frac{2}{4}$ • Look at the fraction wall.  How many times can you find $\frac{1}{2}$ or $\frac{2}{4}$?

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