Year 3

Mastery Overview
Summer

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

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:

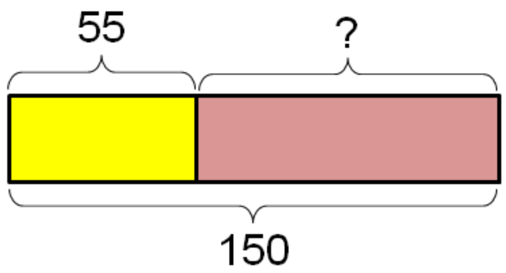
- have number at their heart. A large proportion of time is spent reinforcing number to build competency.
- ensure teachers stay in the required key stage and support the ideal of depth before breadth.
- ensure students have the opportunity to stay together as they work through the schemes as a whole 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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Year 3

Mixed Year & Reception Planning

We have been working on mixed year and reception versions of our planning documentation and guidance. These have been created by teachers from across our region and wider. Working documents can be found in the Dropbox, although we hope that the final documents will be available later on in the summer term. Please contact the Hub if you would like any more information.

Problem Solving

As a Hub we have produced a series of problems for KS1 and KS2. These can be found here.
http://tinyurl.com/zfeq8gs

We are hoping to release more in September. 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’.

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

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Year 3 Overview

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<tr><th>Autumn</th><td colspan="2">Number: Place Value</td><td colspan="4">Number: Addition and Subtraction</td><td colspan="4">Number: Multiplication and Division</td><td colspan="2">Measurement</td></tr>
<tr><th>Spring</th><td colspan="3">Number: Multiplication and Division</td><td colspan="3">Measurement</td><td colspan="4">Number: Fractions</td><td colspan="2">Consolidation</td></tr>
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Term by Term Objectives

Year 3

Year Group	Y3	Term	Summer

<table>
<tr><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>
<td colspan="4"><u>Number: Fractions</u>

Recognise and show, using diagrams, equivalent fractions with small denominators.

Add and subtract fractions with the same denominator within one whole.

Compare and order unit fractions, and fractions with the same denominators.

Solve problems that involve all of the above.</td>
<td colspan="2"><u>Geometry: Property of Shapes</u>

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.

Draw 2-D shapes and make 3-D shapes using modelling materials.

Recognise 3-D shapes in different orientations and describe them.</td>
<td colspan="4"><u>Measurement</u>

Measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml).

Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction.

Continue to measure using the appropriate tools and units, progressing to using a wider range of measures, including comparing and using mixed units (for example, 1kg and 200g) and simple equivalents of mixed units (for example, 5m = 500cm).</td>
<td><u>Statistics</u>

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?’) using information presented in scaled bar charts and pictograms and tables.</td>
<td><u>Consolidation</u></td>
</tr>
</table>

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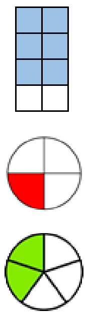
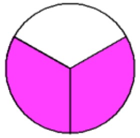
Term by Term Objectives

Year 3

	National Curriculum Statement	All Students		
		Fluency	**Reasoning**	**Problem Solving**
Fractions	Recognise and show, using diagrams, equivalent fractions with small denominators.	• Complete the statements: $\frac{1}{2} = \frac{}{6}$ $\frac{1}{2} = \frac{}{4} = \frac{}{8}$ • Draw diagrams to show fractions that are equivalent to $\frac{1}{2}, \frac{1}{3}, \frac{2}{5}$ • Match the diagram to the equivalent fraction.  $\frac{2}{8}$ $\frac{4}{10}$ $\frac{3}{4}$	• What's the same? What's different? $\frac{1}{4}, \frac{2}{8}, \frac{3}{12}$ • Here is a diagram that has some sections shaded.  Ailish says, "I am thinking of an equivalent fraction to this where the numerator is 5." Is this possible? Explain why. • Explain how this diagram shows both $\frac{2}{3}$ and $\frac{4}{6}$ 	• Can you work out the missing values? $\frac{1}{2} = \frac{4 - ★}{★ \times 2}$ $\frac{3}{★} = \frac{5+1}{3+5}$ Can you create your own for a friend to complete? • Play pairs. Create a set of cards that have different diagrams and fractions on. Children turn 2 over in their go. If they are equal fractions then they keep the pair. If not, they turn them back over and it is the other players turn. The player who has the most pairs at the end wins.

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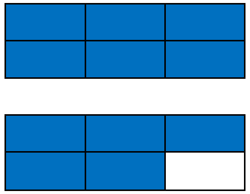
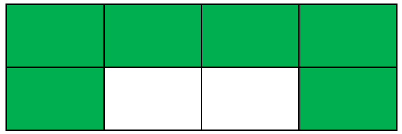
Term by Term Objectives

Year 3

Fractions	Add and subtract fractions with the same denominator within one whole.	• Complete the statements: $\frac{1}{5} + \frac{3}{5} =$ $\frac{6}{8} - \frac{3}{8} =$ $\frac{2}{10} + \frac{3}{10} + \frac{4}{10} =$ • Write these statements using numbers: 1 sixth + 3 sixths = $\boxed{}$ Sixths 5 eighths - 3 eighths = $\boxed{}$ Eighths • Find the sum of: $\frac{2}{12}, \frac{4}{12}$ and $\frac{5}{12}$	• Explain why only the numerator changes in this calculation $\frac{2}{5} + \frac{9}{5} =$ • Rick is stuck on the calculation $\frac{11}{6} - \frac{3}{6} =$ His friend, Susie, draws him the following model to help.  Susie says, “Now take $\frac{3}{6}$ away”. Rick is confused because he thinks the diagram shows $\frac{11}{12}$. Explain the diagram to Rick and work out the answer.	• Use some of the cards below to make a fraction sentence. Can you make more than 1? 7 - 3 4 + 7 = 1 • How many fraction addition and subtractions can you make from this model?  Do your additions and subtractions always have to be 1 part add 1 part or subtract only 1 part? Can there be more than 2 parts?

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Fractions	Compare and order unit fractions, and fractions with the same denominators.	• Order from smallest to largest $\frac{3}{9}, \frac{1}{9}, \frac{8}{9}, \frac{5}{9}, \frac{9}{9}$ • Use <, > or = to complete the statements below $\frac{4}{9}$ ○ $\frac{2}{9}$ $\frac{1}{7}$ ○ $\frac{1}{5}$ $\frac{2+2}{8}$ ○ $\frac{3+1}{8}$ • Which is greater? 1 ninth or 1 tenth	• Gifty thinks $\frac{1}{8}$ is greater than $\frac{1}{4}$ because 8 is greater than 4. Do you agree? Convince me. • Rob thinks $\frac{1}{4}$ is always the same but his teacher has asked him to find a quarter of both these amounts. a)  b)  Explain to Rob why it is not the same and create a rule with a partner.	• Using equal sized strips of paper ask children to fold them into different amounts (e.g. quarters, sixths etc) and shade one part and write the fraction on each of them. Ask them to order them and explain to each other what they can see. Create a rule as a class: the bigger the denominator, the smaller the fraction. • Using equal sized strips of paper ask children to fold them into equal parts and shade one part. With another piece of paper do the same amount of equal parts but shade 2 of them and so on. Ask them to order them and explain to each other what they can see. Create a rule as a class: when the denominator is the same, the bigger the numerator, the bigger the fraction.

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Fractions	Solve problems that involve all of the above.	• Use different concrete objects and pictorial representations to make $\frac{3}{6}$ • Phil baked a chocolate and banana loaf. He ate $\frac{3}{6}$ of it. Rich ate $\frac{2}{6}$ of it. What amount of loaf was left? • Fill in the missing boxes $\frac{1}{5}+\frac{2}{5}+\frac{2}{5}=\square$ $\frac{4}{7}-\frac{\square}{7}=\frac{5}{7}-\frac{5}{7}$ $\frac{1}{4}+\frac{2}{3}+\frac{\square}{\square}+\frac{1}{3}=2$	• Raja has a number card. $\boxed{40}$ He says, “Three eighths of my number is 20.” Is he correct? Explain why. • Kate has a number card. $\boxed{?}$ She says, “Three quarters of my number is 18.” Her friend, Sally, says, “Six eighths of the same number is also 18.” What is the number on the card? Who is correct? Sally or Kate.	• Three pandas shared 1 bamboo stick. They split it into equal parts and each had an odd number of parts. What are the possible fraction amounts that each panda had? Can you use a strategy or a method? 

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Term by Term Objectives

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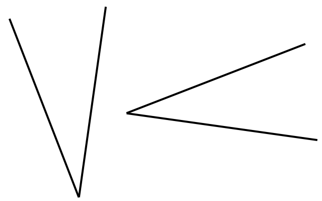
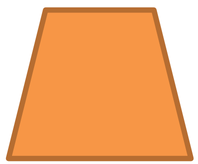
Properties of shape	Recognise angles as a property of shape or a description of a turn.	• Stick the words North, East, South and West on four walls. Ask children to face north then turn to west. How many quarter turns have you made? • Has this angle turned 90° to the left or the right?  • Tick all the angles in this shape. 	• **True or false?** Some shapes have no angles. • **True or false?** The amount of angles a shape has is equal to the amount of sides it has.	• Which of these could be angles? 90° -75° 90°c Explain your choices to a partner. • How many angles can you identify in this picture? 

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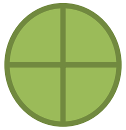
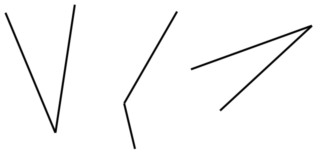
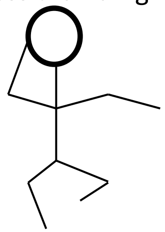
Properties of shape	Identify right angles, recognise that two right angles make a half-turn, three make three quarters of a turn and four a complete turn; identify whether angles are greater than or less than a right angle.	• How many right angles does this circle have?  • Tick the angles that are less than a right angle  • Using 2 sticks or straws, can you make 1, 2 and 4 right angles?	• **True or false?** You can make a right angle with curved lines. • Sahil says, A complete turn equals 360° therefore a shape cannot have more than 360° when their angles are added together. Do you agree?	• Draw different stick men with two arms and two legs. How many different ways can you do where the arms and legs are different sized angles (including greater than and less than a right angle)?  For each drawing write how many greater and/or less than angles there are e.g. 2 angles less than a right angle 2 angles greater than a right angle • Create a group freeze frame showing lots of different angles and draw this afterwards. Can you turn 45° to the left? How has your angle changed?

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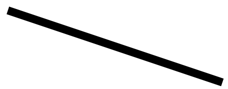
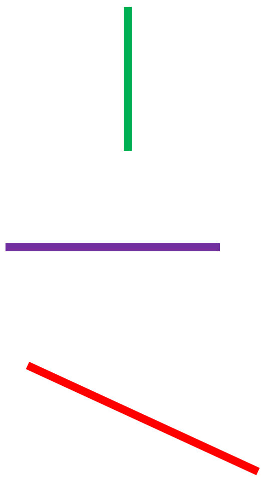
Term by Term Objectives

Year 3

Properties of shape	Identify horizontal and vertical lines and pairs of perpendicular and parallel lines.	• Draw a line so that it is perpendicular to the one given  • Draw a line that is parallel to the one given  • Circle the horizontal line 	• **True or false?** Perpendicular lines have to touch. • **Always, sometimes, never.** When two straight lines cross, there will be 4 right angles made. • **True or false?** Parallel lines never touch. • **Odd one out.** Explain which is different to the others. a)  b) c) 	• Identify all the horizontal and vertical lines. Identify the pairs of perpendicular and parallel lines  • Draw your own picture using all four types of lines. Can your partner identify and label the different lines? • Look at these flags. Can you identify and label the different lines and angles? 

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Properties of shape	Draw 2-D shapes and make 3-D shapes using modelling materials.	• Draw a 2D shape with a pair of parallel lines. Did your friend draw the same or something different? • Use these shapes to create a repeating pattern. Leave a space where you have missed out a shape – can your partner guess what the shape should be?  • Label the angles in your shapes – are they greater than or less than 90°	• **True or false?** You can cut out lots of equal squares and make a 3D shape from them. • Explain why all the triangles need to be the same size for the net of pyramid. • **True or false?** With an unlimited amount of straight sticks, you can make any 2D or 3D shape.	• Look through a magazine/newspaper and identify the shapes you see. Organise them into different groups. Do some shapes fit into more than one group? Why? • Using Play-doh, ask children to make a 3D shape. Ask them to make a different one to their partner. Write down the similarities and differences between them. Discuss what the properties are.

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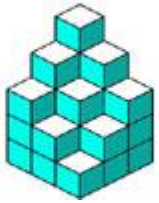
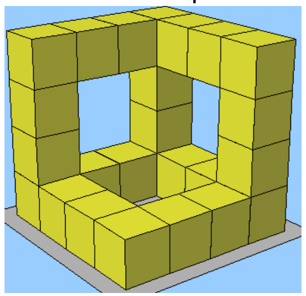
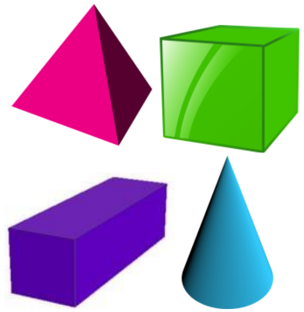
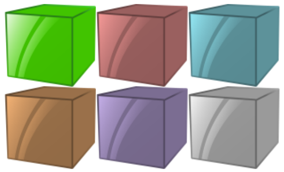
Term by Term Objectives

Year 3

Properties of shape	Recognise 3-D shapes in different orientations and describe them.	• What is this shape made up of?  Does your partner agree? Can they see anything different? • Can you build this shape? What does it look like when you half turn it? Describe it to a partner.  • 3D shape hunt. Find the shapes hidden in the classroom. Group them together with others.	• **Odd one out.**  Explain why it is the odd one out using the correct vocabulary for its properties. • **True or false.** A wizard's hat will be able to be turned upside down and still stand upright on its own. 	• Use 6 cubes. How many different shapes can you make? Can you try and draw them? Dotted paper may help.  • Pick a 3D object in the classroom. Visualise it being rotated by 180° Describe it to a partner. Can they guess it?

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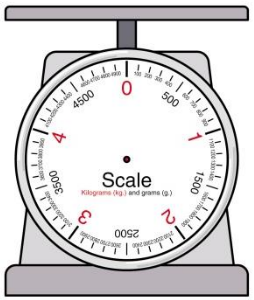
Measurement	Measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml).	• Use <, > or = to complete the statements below 750g ◯ 0.8kg 500ml ◯ Half a litre 17mm ◯ 2cm – 5mm • Penny bought 3 tins of beans from the shop. They each weighed 418g each. The bag weighed 5 grams. How heavy was the bag? • A pack of strawberries weighing 226g and 2 jars of coffee, each weighing 480g, are put on the scale.  Draw an arrow to show the weight of the 3 items.	• Adam makes 2.5 litres of lemonade for a charity event. He pours it into 600ml glasses to sell. He thinks he can sell 7 glasses. Is he correct? Prove it. • Here is a blue strip of paper.  An orange strip is 7 times longer.  The strips are joined end to end.  32cm How long is the blue strip? How long is the orange strip? Show your working.	• In groups, children turn over a flashcard to reveal a length (e.g. 20cm). They use Play Do to create a stick of the length given. They do this through estimate then check by measuring. What is the difference between the smallest and largest Play Do stick? • Using only 3 objects each time, try to get as close to 2kg as possible. Explain why you chose those objects. Work out how much more or how much less is needed to make it 2kg. • Erik is making buns for 12 people. He follows this recipe for 6 people. 65g caster sugar 70g butter 60g self-raising flour 1 egg Sugar, butter and flour are all sold in 200g packs. Work out how much he will have left over of each. Does he have enough to make 6 more buns? 4 buns? 2 buns? 

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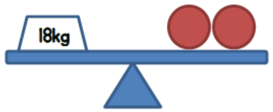
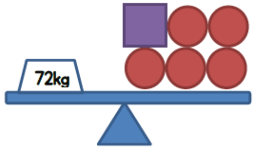
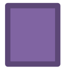
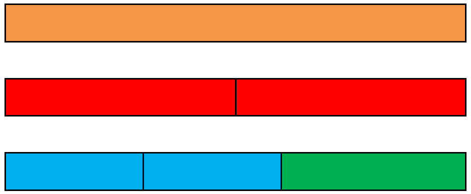
Measurement	Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction.	• Fill in the missing boxes 0.5l + 250ml = 1500ml – $\square$ 0.25l × $\square$ = 2l + 500ml • 3m – $\square$ + 750cm = 2m 3.5kg + $\square$ - 1.5kg = 3.5kg 0.2l + 0.8l - $\square$ = 0.9l • Adam, Danny and JoJo have 7kg worth of marbles to share. Adam receives double the amount Danny receives. Danny receives double the amount JoJo receives. How many kg of marbles do they each receive?	**What's the pattern?** • 2kg – $\square$ + 250g = 1kg 3kg – $\square$ + 1.25kg = 1kg 4kg – $\square$ + 2.25kg = 1kg • **What's the rule?** There is 480ml in a container. How much needs to be added to make 1l? How much needs to be added to make 2l? How much needs to be added to make 10l? • Here is a balance.  Here is another balance.  Work out the value of 	• Simon runs 4 times further than Emma. Kelly runs 3.6m further than Simon. Kelly ran 48.6m. How far did Emma run?  • Here are three blocks.  Each red block is 8cm long. A green block is 6cm long. How long is a blue block?

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Term by Term Objectives

Year 3

Measurement	Continue to measure using the appropriate tools and units, progressing to using a wider range of measures, including comparing and using mixed units (for example, 1kg and 200g) and simple equivalents of mixed units (for example, 5m = 500cm).	Complete practically	Complete practically	Complete practically

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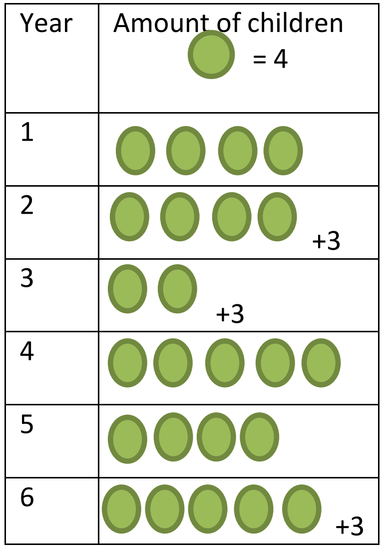
Statistics

Interpret and present data using bar charts, pictograms and tables.

- Transfer the following information into a table.



- Look at the above pictogram. **True or false?** Year 2 has double the amount of children Year 3 has.

- Which would be most suitable for this information? A bar chart or pictogram. Explain why.

Charity	Amount raised in a year (£).
Donkey Rescue	2790
Save the Rhinos	5650
Money for Meerkats	3000
Collecting for cats	4430

- What's the same and what's different about a bar chart and a pictogram?

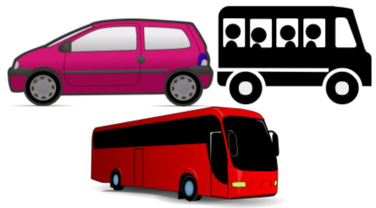
- 62 people are going to a football game. They can travel in a car, minibus or coach.

  A car can hold 5 people.
  A minibus can hold 7 people.
  A coach can hold 15 people.

  Each vehicle they take is full.

  Decide how many of each vehicle is taken to the match.
  Choose a table to represent this information.
  Is this the only option?

  (If this is completed in a pictogram then the images can be printed out for children to move around.)



  It costs £150 to hire the coach.
  It costs £84 to hire a minibus.
  It costs £55 for the petrol in a car.

  What would the cheapest option be for the whole group?

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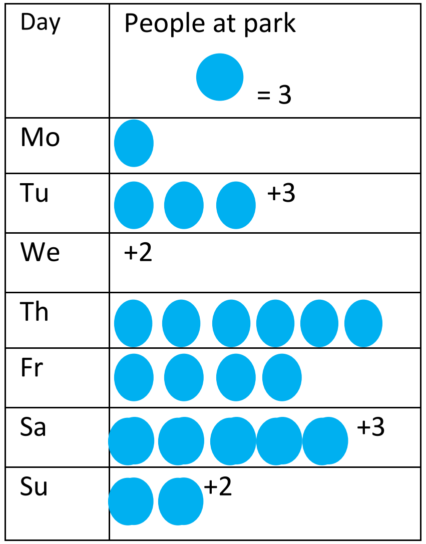
Term by Term Objectives

Year 3

Statistics

Solve one-step and two-step questions (for example, 'How many more?' and 'How many fewer?') using information presented in scaled bar charts and pictograms and tables.



- How many more people went to the park on Sunday than Monday?
- How many fewer went to the park on Wednesday than the day after?
- How many people attended in the week if all the people were different?
- The next week 12 more people went on Saturday. How many went?

- **True or false?**
  At the park there 4 double swings and 6 single swings.
  Look at the table on the left.
  There weren't enough swings for the people at the park on Thursday.

- **Always, sometimes, never.**
  Pictograms can only have data where each row is a multiple of the key given.
  e.g. If the key equals 3 then only multiples of 3 can be in the pictogram.

- How many questions can you create for your partner for this set of data?

Day	Amount of hours shop open
Monday	6
Tuesday	8
Wednesday	8.5
Thursday	7
Friday	10
Saturday	12

- Look at the table above.
  The shop closes for 45 minutes each day so the workers can have their lunch. How many hours are the workers there in a week?

- Work in a group to work out how many hours you each spend sleeping a week.
  Consider what will be the best way to record these results so they can all be displayed in one graph.

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