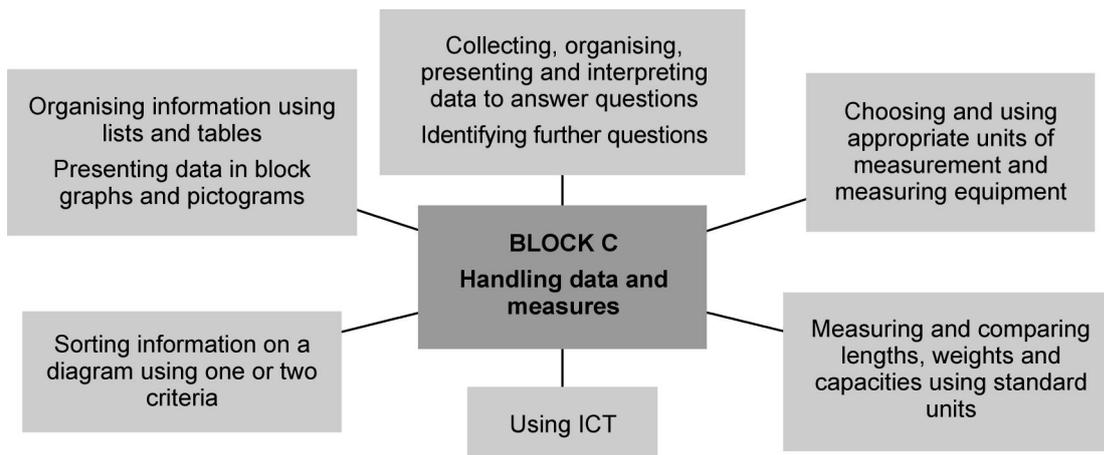


Handling data and measures



Objectives	Units		
	1	2	3
End-of-year expectations (key objectives) are highlighted			
• Follow a line of enquiry; answer questions by choosing and using suitable equipment and selecting, organising and presenting information in lists, tables and simple diagrams	✓	✓	✓
• Answer a question by collecting and recording data in lists and tables; represent the data as block graphs or pictograms to show results; use ICT to organise and present data	✓	✓	✓
• Use lists, tables and diagrams to sort objects; explain choices using appropriate language, including 'not'	✓	✓	✓
• Estimate, compare and measure lengths, weights and capacities, choosing and using standard units (m, cm, kg, litre) and suitable measuring instruments	✓	✓	✓
• Read the numbered divisions on a scale, and interpret the divisions between them (e.g. on a scale from 0 to 25 with intervals of 1 shown but only the divisions 0, 5, 10, 15 and 20 numbered); use a ruler to draw and measure lines to the nearest centimetre	✓	✓	✓

Speaking and listening objectives for the block

Objectives	Units		
	1	2	3
• Listen to others in class, ask relevant questions and follow instructions	✓		
• Ensure everyone contributes, allocate tasks, consider alternatives and reach agreement		✓	
• Explain their views to others in a small group; decide how to report the group's views to the class			✓

Opportunities to apply mathematics in science

Activities		Units		
		1	2	3
2a	Health and growth: Collect information on favourite foods. Present results in a table and as a pictogram.	✓		
2e	Forces and movement: Measure distances travelled by toy cars using standard or non-standard units. Record in a table and a block graph.		✓	
2f	Sort pictures of different types of electrical appliances found in school or at home, e.g. things which make sound or light, give out heat or move.			✓

Key aspects of learning: focus for the block

Enquiry	Problem solving	Reasoning	Creative thinking
Information processing	Evaluation	Self-awareness	Managing feeling
Social skills	Communication	Motivation	Empathy

Vocabulary

problem, question, explain, predict, pattern, collect, organise, compare, order, sort, group, classify, same, different, property, represent, interpret, count, tally, vote, measure, weigh, guess, estimate

information, graph, block graph, pictogram, diagram, symbol, set, list, table, label, title

zero, one, two, three, ..., hundred, first, second, third, ..., more/less, most/least, most/least popular, most/least common, about the same as, enough, not enough, too much, too little, too many, too few, nearly, roughly, about, close to, just over, just under

unit, centimetre (cm), metre (m), kilogram (kg), half-kilogram, litre (l), half-litre, ruler, metre stick, tape measure, balance, scales, container, measuring jug, capacity, weight, length, width, height, depth, size, long, short, tall, high, low, wide, narrow, deep, shallow, thick, thin, and comparatives such as longer/longest, heavier/heaviest, holds more/holds most

shape, curved, straight, hollow, solid, flat, side, corner, point, face, edge, cuboid, pyramid, cone, cylinder, sphere, triangle, circle, rectangle, square

Building on previous learning

Check that children can already:

- answer a question by collecting and recording information in a list or table
- present outcomes using practical resources, pictures, block graphs or pictograms
- use diagrams to sort objects into groups according to a given criterion; suggest a different criterion for grouping the same objects
- estimate, measure, weigh and compare objects using suitable uniform non-standard units and measuring instruments, for example a lever balance, metre stick or measuring jug
- name common 2-D shapes and 3-D solids, and describe their features

Objectives <i>Children's learning outcomes in italic</i>	Assessment for learning
<ul style="list-style-type: none"> Follow a line of enquiry; answer questions by choosing and using suitable equipment and selecting, organising and presenting information in lists, tables and simple diagrams <i>I can decide what information I need to answer a question</i> <i>I can put information in lists or tables</i> 	<p>Which soft drink should we serve at our sports day? What information do you need to answer the question? Is this a good way to present information? Why?</p>
<ul style="list-style-type: none"> Answer a question by collecting and recording data in lists and tables; represent the data as block graphs or pictograms to show results; use ICT to organise and present data <i>I know how to collect information</i> <i>I can use lists and tables to show what I found out</i> 	<p>How did you collect the information? Why did you decide to present the information in a list/table? What does your list/table show? How does this help you to answer the question?</p>
<ul style="list-style-type: none"> Use lists, tables and diagrams to sort objects; explain choices using appropriate language, including 'not' <i>I can sort objects and talk about how I sorted them</i> 	<p>How did you sort the objects/numbers? Why have you placed this object in this set? These objects have been sorted into two sets. How do you think they have been sorted? Why is this object not in the other set?</p>
<ul style="list-style-type: none"> Estimate, compare and measure lengths, weights and capacities, choosing and using standard units (m, cm, kg, litre) and suitable measuring instruments <i>I can find out if something is longer or shorter than a metre</i> <i>I can find out if something will hold a litre of water</i> <i>I can use a balance to compare two things to see which is lighter</i> <i>I can use a balance to find out if something is lighter or heavier than a kilogram or half-kilogram</i> 	<p>Show me something that you think is just shorter/longer than a metre. How could you check whether you are right? When you use a balance, how could you find out if something is heavier than a kilogram/half-kilogram? What would you need to do? Tell me an object in the classroom that you think is heavier than this 100 g bag of cubes/kilogram/half-kilogram. How could you check if it is?</p>
<ul style="list-style-type: none"> Read the numbered divisions on a scale, and interpret the divisions between them (e.g. on a scale from 0 to 25 with intervals of 1 shown but only the divisions 0, 5, 10, 15 and 20 numbered); use a ruler to draw and measure lines to the nearest centimetre <i>I can read numbers on a scale</i> 	<p>Look at this metre ruler. What length does this mark between 10 cm and 20 cm show? Is the water in this measuring jug nearer $\frac{1}{2}$ litre or 1 litre?</p>

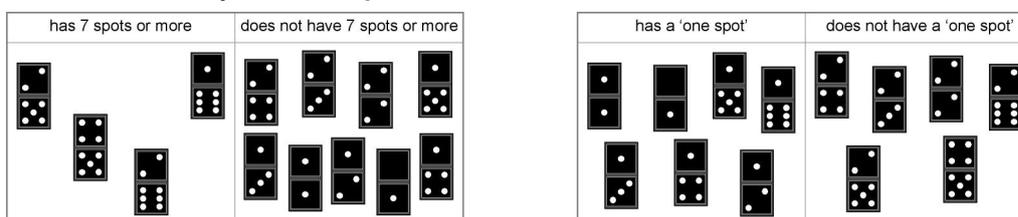
Objectives	Assessment for learning
<i>Children's learning outcomes in italic</i>	
<ul style="list-style-type: none"> Listen to others in class, ask relevant questions and follow instructions <p><i>I can listen to children talking about their ideas</i></p> <p><i>I can ask them questions about what they have said</i></p>	<p>Show your table to the group. Ask the other children questions that they can answer using the information that your table shows.</p> <p>Are there other questions that the table could help you to answer?</p>

Learning overview

Children **process, present and interpret data** to answer questions and **follow lines of enquiry**. They use various contexts, including measurement, to generate data which will allow them to **make comparisons** and **draw conclusions**.

Children **classify** objects and numbers and **organise** them in **lists** and **simple tables**. For example, they make a list of all the multiples of 10 between 0 and 100 or all the odd numbers between 15 and 35.

They **sort** objects and numbers into groups according to one criterion. They sort 3-D shapes into groups that *make good building blocks/ do not make good building blocks*. They sort a set of dominoes using *has 7 spots or more/ does not have 7 spots or more*. They justify their choice of where to place a shape or number on a sorting diagram. They choose different criteria for sorting the same set of objects and **explain** their criteria to others.



Children discuss the meaning of 'not' and identify coloured shapes that are not red, not blue or not green. They find numbers that are not even, or not less than 20.

Children **solve problems** and respond to questions such as:

Are names with five letters the most common?

How could we find out?

What information should we collect?

How shall we organise the information?

They listen to others in the class and respond to their suggestions. Children collect data quickly – for example, by holding up a digit card corresponding to the number of letters in their first name – and follow instructions to make a simple table.

Our names

3 letters	4 letters	5 letters	6 letters
Ann	Kate	Halim	Pritam
Sam	Ajit	David	Sophie
Ali	Tara	Jyoti	
	Mark		

Children answer questions based on their table, such as:

What is the most common number of letters in a name? How do you know?

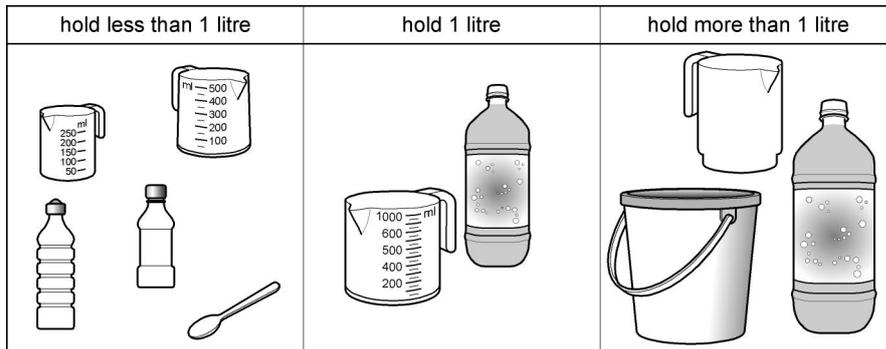
How many names have exactly 5 letters?

How many names have more than 5 letters?

How many names have fewer than 5 letters?

How many children are there altogether in the class? How can you tell?

Children use **standard units of measure** as they **follow an enquiry**. For example, they sort a set of containers according to whether they will hold a litre of water, less than a litre of water or more than a litre of water. They place the containers appropriately in a large diagram.



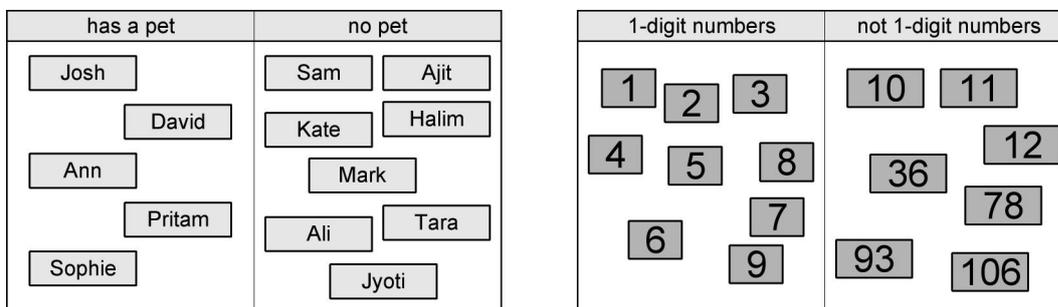
They carry out similar sorting activities to compare lengths against a metre rule, and weights of various objects against a kilogram, half-kilogram or another given measure.

Objectives <i>Children's learning outcomes in italic</i>	Assessment for learning
<ul style="list-style-type: none"> Follow a line of enquiry; answer questions by choosing and using suitable equipment and selecting, organising and presenting information in lists, tables and simple diagrams <i>I can organise information and make lists and tables</i> 	<p>How could you make the table? What headings do you need?</p> <p>How could you make the list? Would it help to put the information in order?</p> <p>Which of these ways of presenting the information helps us best to answer the question?</p>
<ul style="list-style-type: none"> Answer a question by collecting and recording data in lists and tables; represent the data as block graphs or pictograms to show results; use ICT to organise and present data <i>I can make block graphs and get information from other people's graphs</i> 	<p>Why is a block graph a good way of showing your results?</p> <p>What does the tallest column of blocks mean?</p> <p>How did the block graph help you to answer the question?</p> <p>If we asked all the teachers about the soft drink that they like best, would there be a column of blocks that was taller than the others? Would it be for the same soft drink as your tallest column?</p>
<ul style="list-style-type: none"> Use lists, tables and diagrams to sort objects; explain choices using appropriate language, including 'not' <i>I can sort objects and use diagrams to show how I sorted them</i> 	<p>Why have you put this object in this part of the diagram?</p> <p>What else could be placed here?</p> <p>Which children are 7 years old and have a pet?</p>
<ul style="list-style-type: none"> Estimate, compare and measure lengths, weights and capacities, choosing and using standard units (m, cm, kg, litre) and suitable measuring instruments <i>I can estimate whether a container holds more or less than a litre</i> <i>I can estimate whether an object is heavier or lighter than a half-kilogram by putting a half-kilogram in one hand and the object in the other</i> <i>I know how long a metre is and I know how long a centimetre is</i> 	<p>Point out something that you think is about two metres high/tall/long.</p> <p>What can you see that you think is just shorter/longer than a metre?</p> <p>Which containers do you think will hold just a little more than a litre?</p> <p>This strip is 20 cm long. How could you use this to help you find a book that is about 40 cm tall? How could you use it to find a book that is about 10 cm wide? Show me how you would use it to check that this book is about 23 cm tall.</p>
<ul style="list-style-type: none"> Read the numbered divisions on a scale, and interpret the divisions between them (e.g. on a scale from 0 to 25 with intervals of 1 shown but only the divisions 0, 5, 10, 15 and 20 numbered); use a ruler to draw and measure lines to the nearest centimetre <i>I can use a ruler or metre stick to measure how long something is</i> <i>I can read numbers on a scale and work out the numbers between them</i> 	<p>On the graph, how do you work out the numbers between the labels? Which way of getting to school was used by 7 children? These labels show only 0, 2, 4, 6, 8 and 10. How could you find 7?</p> <p>If this scale carried on, what other numbers do you think would be shown? Would the number 34 be shown? How can you tell?</p>

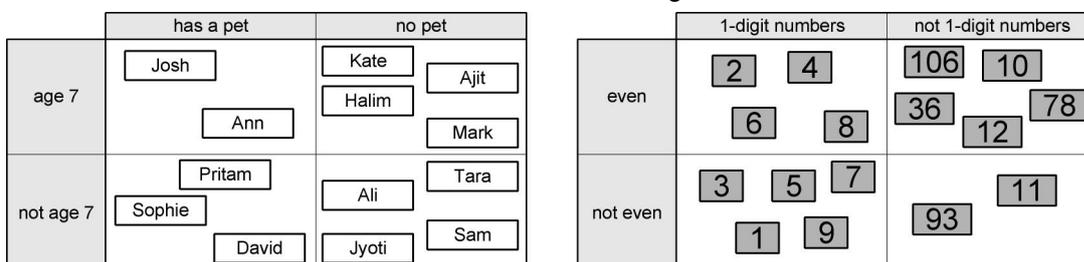
Objectives	Assessment for learning
<i>Children's learning outcomes in italic</i>	
<ul style="list-style-type: none"> Ensure everyone contributes, allocate tasks, consider alternatives and reach agreement <p><i>I can work with other children and make sure everyone has a turn</i></p> <p><i>I can work with other children to make sure everyone knows what they should do and joins in</i></p> <p><i>When we work together we all think about different ways we can do something</i></p> <p><i>We can agree on what we should do</i></p>	<p>How will you work together to collect the information?</p> <p>How will you split the work so that everyone knows what they should do?</p> <p>How will you decide as a group?</p>

Learning overview

Children work collaboratively in a group to plan and **carry out an enquiry**. They consider different ways of approaching the task. They agree on how they are going to work and the roles that they will take. They **classify** objects and numbers according to one criterion and progress to using **two criteria**. For example, they might sort themselves according to whether or not they have a pet and place name cards in the appropriate space on a sorting diagram. They sort a set of number cards according to whether they are *1-digit numbers/not 1-digit numbers*.



Children then choose a **second criterion**. For sorting themselves they might choose *age 7/not age 7* and reposition their name cards accordingly. For sorting the numbers they might choose *even/not even* and move the cards above or below the new dividing line.



Children answer questions based on their diagram, such as:

Who is 7 and does not have a pet?

How many children are not 7 and do not have a pet?

How many children do not have a pet?

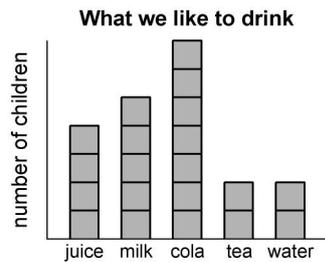
If we were to ask children in Class 3 to put their names in a diagram like this, how would the diagram look? Would there be some names in every part of the diagram? Why do you think so?

They solve problems such as finding which soft drink is most popular with children in the class. They ask and answer questions such as:

How could we find out?

How shall we organise the information?

Children make a **block graph** and explain what it shows to others. They point to the columns, referring to the names of drinks and using these to support their explanation.



They answer questions such as

Which drink had the most votes?

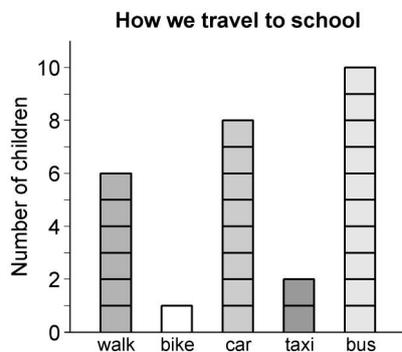
Why do you think this is?

Who would find it useful to know? Why?

How many children did we ask?

Do you think the information will be different if we asked in the winter? Why?

Children gather information to answer a question about how they travel to school, for example. They present data in a block graph where the vertical axis is labelled and marked in twos. Children **read the scale, interpreting numbers** between those marked. They explain the graph to others.



They consider questions such as whether the graph would be the same in the summer or the winter, or whether it would look the same for a Year 6 class. They discuss reasons why the graphs may be different for different groups of children, or at different times of the year.

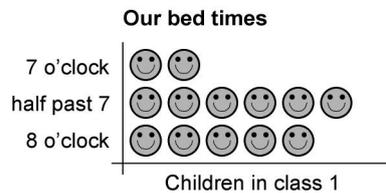
Children make and record **measurements** for a purpose as they **follow an enquiry**. For example, they work collaboratively to plan an experiment to find which toy car rolls furthest. After some initial trials rolling cars down a small ramp, they recognise the need to use centimetres as the unit to measure and compare distances. They use a metre tape or rule, marked and numbered in centimetres, to measure the distance rolled from the foot of the ramp to where the car stopped. They collect information in a list and present it in an ordered table, starting with the car that rolled the longest distance.

Objectives <i>Children's learning outcomes in italic</i>	Assessment for learning
<ul style="list-style-type: none"> Follow a line of enquiry; answer questions by choosing and using suitable equipment and selecting, organising and presenting information in lists, tables and simple diagrams <i>I can test out an idea by collecting and organising information</i> 	<p>Someone said that children in our class are in bed by half past 7. How could we find out if that is true? What do you think we will find? Why? What information do we need? How are we going to collect it?</p>
<ul style="list-style-type: none"> Answer a question by collecting and recording data in lists and tables; represent the data as block graphs or pictograms to show results; use ICT to organise and present data <i>I can use ICT to show results</i> 	<p>What information did you need to type in? Is this different from our block graph? How?</p>
<ul style="list-style-type: none"> Use lists, tables and diagrams to sort objects; explain choices using appropriate language, including 'not' <i>I can sort objects in different ways and explain how I sorted them</i> 	<p>Why doesn't Tali's name go here? What kinds of numbers belong in this space? Could we put 11 in this space? How did you decide? What if Josh had brown hair but eyes that were not brown – where would his name go then? Tell me why the number 6 cannot go in this space.</p>
<ul style="list-style-type: none"> Estimate, compare and measure lengths, weights and capacities, choosing and using standard units (m, cm, kg, litre) and suitable measuring instruments <i>I can measure length, using a metre tape or a ruler</i> <i>I can measure in centimetres/metres</i> <i>I can use a measuring jug to measure a litre of water and to find out how much water other containers hold</i> <i>I can measure weight in kilograms and half-kilograms</i> 	<p>Should we measure the ... in centimetres or metres? Why? Would it be better to measure with a tape measure or a ruler? Do you think the bucket holds 5 litres of water? How can we find out?</p>
<ul style="list-style-type: none"> Read the numbered divisions on a scale, and interpret the divisions between them (e.g. on a scale from 0 to 25 with intervals of 1 shown but only the divisions 0, 5, 10, 15 and 20 numbered); use a ruler to draw and measure lines to the nearest centimetre <i>I can read scales marked in 5s and 10s</i> <i>I can measure and draw lines to the nearest centimetre</i> 	<p>This metre stick has a number label every 5 cm. Where is the mark for 17 cm? Tell me some important tips to help someone to measure a length using a tape or ruler accurately. What would happen if you didn't start measuring from zero on the ruler? How should the balance look before you put the kilogram in one bucket and your object in the other? Why?</p>
<ul style="list-style-type: none"> Explain their views to others in a small group; decide how to report the group's views to the class <i>I can explain a diagram that shows our results and I can use different parts of the diagram to help me</i> 	<p>Why do you think that fewer children walk to school than come by bus? How are you going to report your work to the class? Explain how you made your graph and what it shows.</p>

Learning overview

Children consolidate their understanding of **processing, presenting and interpreting data**. They use their data handling skills to answer questions and **follow lines of enquiry**. They use contexts, including measurement, to generate data, **make comparisons** and **draw conclusions**.

Children test a **hypothesis** such as: *children in our class are in bed before 8 o'clock*. They decide what information they need and how to collect it. They do this quickly – for example, by a show of hands – and then make a **simple pictogram** where the **symbol** represents one unit. For example:



They use the diagram to explain what they have found out, pointing out the symbols and the different times shown to support their explanation. Children answer question such as:

How many children go to bed at half past 7?

How many children were asked?

How many children go to bed before 8 o'clock?

Do you think the pictogram would look the same for Class 4? Why do you think it might look different?

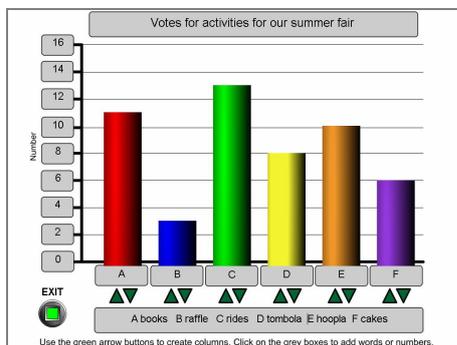
Children consider questions such as which activities they would like to see at the school's summer fair. They answer questions such as:

How could you decide?

What information do you need?

How will you organise the information?

They develop a key such as A for a book stall, B for a raffle, C for pony rides, D for a tombola, E for hoopla and F for a cake stall. They collect information quickly by a show of hands to vote for each suggested activity. They repeat the voting, this time allowing each child to have two votes. They make and compare **block graphs using ICT**.



They use their block graphs to answer questions such as:

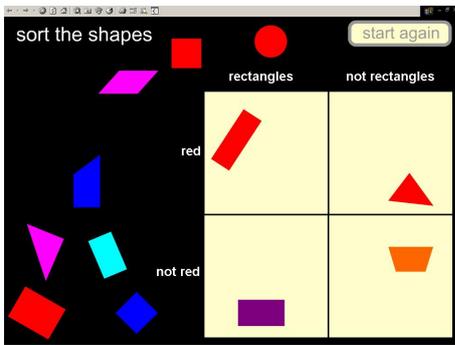
*What was the **most popular** choice? What was the **least popular** choice? Are these the same when you have two votes each?*

How many more people voted for pony rides than voted for hoopla?

Do you think that if we asked Class 5 pony rides would be their most popular choice? What makes you think their most popular activity would be different?

If we were choosing activities for a Christmas Fair, would we have the same results?

Children continue to sort objects on a Carroll diagram, to extend their understanding of 'not'. For example, they sort shapes into *red/not red* and *rectangles/not rectangles*.



Children **measure** length. For example, they measure how far they can flick a penny on a PE mat. They use tapes or rulers to measure the distances to the nearest centimetre, and record their data on a paper tape marked in centimetres but numbered in fives: 0, 5, 10, 15, ... They compare their tapes and put them into order from shortest distance flicked to the longest.

They carry out other measuring activities to order containers by capacity or objects by weight. For example, they sort containers and present their results in a table.

Holds less than 1 litre	Holds 1 litre	Holds between 1 and 2 litres	Holds 2 litres