White Rose Maths

Statistics

Overview

Small Steps

Make tally charts

Draw pictograms (1-1)

Interpret pictograms (1-1)

Draw pictograms (2, 5 and 10)

Interpret pictograms (2, 5 and 10)

Block diagrams

NC Objectives

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.

Make Tally Charts

Notes and Guidance

Children are introduced to tally charts as a systematic method of recording data.

They should already be able to count in 5s and understand the vocabulary of total, altogether, more, less and difference.

Mathematical Talk

What do you notice about the groups? How would we count these?

How would you show 6, 11, 18 as a tally?

Why do we draw tallys like this?

When do we use tallys?

Varied Fluency

Complete the tally chart.

Favourite Colour	Tally	Total
Blue	卌 |||	
Red	卌 卌 ||	
Yellow	||	
Green	|||	

What does the data tell you? Tell me the story.

Complete the tally chart for Year 2 and Year 3

Year Group	Tally	Total
Year 1	卌 卌	10
Year 2		19
Year 3	卌 卌 卌 卌 ||	
Year 4	卌 卌 卌 ||	17

Make a tally chart about one of the following topics:
- Equipment in class (scissors, glue etc.)
- Favourite sport
- Favourite fruit
- Ways of getting to school (walk, car, cycle etc.)
- A choice of your own

Reasoning and Problem Solving

Dexter makes a tally chart of the animals he saw at the zoo

Animal	Tally
🐢	卌
🐘	‖‖
🐼	‖
🐴	卌 ‖

Tick one box below that shows all of the animals Dexter saw and explain why the others are incorrect.

Box 1 is incorrect because there are not enough elephants to match the tally chart.
Box 2 is incorrect because there are not enough pandas to match the tally chart.
Box 3 is incorrect because there are too many turtles.

Class 1 and Class 2 were each asked their favourite ice-cream flavours. Their results are shown in the tally charts.

Class 1	
Flavour	Total
Vanilla	卌 卌 卌
Chocolate	卌 卌 卌 卌
Strawberry	卌 ‖
Mint	‖

Class 2	
Flavour	Total
Vanilla	卌 卌 ‖
Chocolate	卌 卌 卌 卌
Strawberry	卌
Mint	‖‖

What is the same? What is different?

The same:
Both classes have 20 votes for chocolate. Both tally charts show that chocolate is the favourite flavour and mint is the least favourite flavour. The order of preference for all four flavours is the same.
Different:
In Class 1, three more children like Vanilla. There are more children in Class 1 than Class 2. 2 more children chose mint in class 2

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Draw Pictograms (1-1)

Notes and Guidance

Children use tally charts to produce pictograms. They build pictograms using concrete apparatus such as counters or cubes then move to drawing their own pictures.
They need to be able to complete missing column or rows.
They should use the same picture to represent all the data in the pictogram and line this up carefully.
It is important that children see pictograms both horizontally and vertically.

Mathematical Talk

How do you know how many images to draw?

What is the same and what is different about these two pictograms? (same data but shown horizontally and vertically)
Which pictogram is easier to read? Why?

What simple symbol could we draw to represent the data?
Why did you choose this?

Varied Fluency

Complete the pictogram.

Hair Colour		Total
Black	○○○○○	5
Blonde	○○○○○○	
Brown		9
Ginger	○○○○	4

Key

○ = 1 person

Use the tally chart to help you complete the pictogram.

Fruit	Tally
Banana	卌 |
Grape	||||
Pear	卌 |||
Apple	|||

Fruit	
Banana	
Grape	
Pear	
Apple	○○○

Key

○ = ___

Complete the pictogram using the data given.

Name	Tally
Teddy	||
Annie	卌 ||||
Amir	卌
Whitney	卌 |

Key

⚽ = 1 goal

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Reasoning and Problem Solving

Here is a pictogram showing the number of counters each child has.

Dexter	(circles)
Alex	(circles)
Mo	(circles)
Rosie	(circles)

How could you improve the pictogram?

Possible answer
Children show understanding that the pictogram is hard to read as the symbols are overlapping each other. The pictures must be lined up and evenly spaced. There are also different sized circles representing the data. The pictures need to be the same size. There isn't a key.

Use the clues below to help you complete the pictogram.
- More Caramel was sold than Bubblegum flavour, but less than Strawberry flavour.
- Mint was the most popular flavour.
- Vanilla was the least popular.

Flavour	🍦 = 1 ice cream	Total
Strawberry	🍦🍦🍦🍦🍦🍦🍦🍦	
Vanilla		
Chocolate	🍦🍦🍦🍦	
Mint		
Caramel		
Bubblegum	🍦🍦🍦🍦	4

Can you find more than one way to complete the pictogram?

Various answers, e.g.
Strawberry – 8
Vanilla – 1
Chocolate – 4
Mint – 9
Caramel – 6
Bubblegum – 4

Interpret Pictograms (1-1)

Notes and Guidance

Children use their knowledge of one-to-one correspondence to help them interpret and answer questions about the data presented in pictograms.

It is important that children are able to compare data within the pictograms.

Mathematical Talk

What is the pictogram showing us?
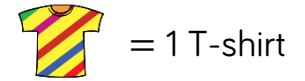
What can you find out from this pictogram?

Can you think of your own questions to ask a partner?

Varied Fluency

Here is a pictogram to show Class 5s favourite t-shirts.

Colour	
Blue	👕👕👕👕👕👕👕👕
Green	👕👕
Red	👕👕👕👕
Purple	👕👕👕👕👕👕

Key

👕 = 1 T-shirt

What is the most popular colour t-shirt?
What colour is the least popular t-shirt?
How many more children chose blue t-shirts than red?
How many children are in Class 5?

Here is a pictogram to show minibeasts collected by Class 5.

Minibeast	
Woodhouse	⬤⬤⬤⬤⬤⬤⬤⬤
Ladybird	⬤⬤⬤⬤⬤
Centipede	⬤⬤
Worm	⬤⬤⬤⬤
Spider	⬤⬤⬤⬤

Key

⬤ = 1 minibeast
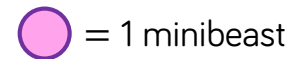
There are ____ ladybirds.
There are ____ centipedes and worms altogether.
There are ____ more worms than centipedes.
What else does the pictogram tell us?

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Teddy writes these statements about his pictogram:

- There were more cows than sheep.
- There were the same number of sheep and horses.
- There were more chickens than any other animal.
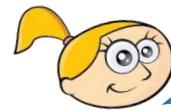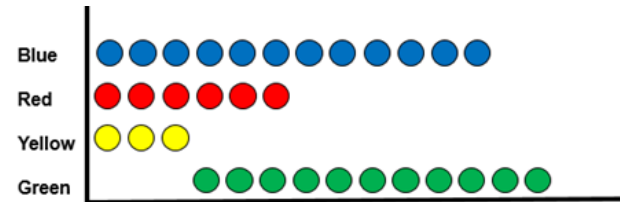- There were less cows than goats.
- There were 8 goats.

Can you draw a pictogram so that Teddy's statements are correct?
What title would you give it?

Possible answer

Pictogram to show the number of animals spotted at the farm

| Chickens | Cows | Sheep | Goats | Horses |
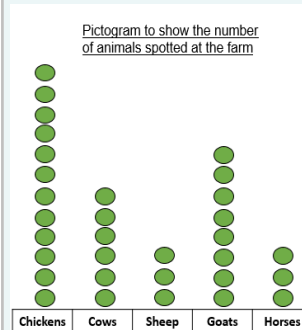
Children may have different numbers from this and still be correct.
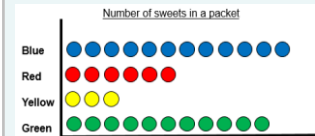
Here is a pictogram.

Blue
Red
Yellow
Green

The most popular colour sweet is green.

Do you agree with Eva?

Explain why and correct any mistakes.

Eva is wrong because the green sweets are not lined up correctly. There are 11 green and 12 blue.

It should look like this:

Number of sweets in a packet

Blue
Red
Yellow
Green

Draw Pictograms (2, 5 & 10)

Notes and Guidance

Children draw pictograms where the symbols represent 2, 5 or 10 items.

The children will need to interpret part of a symbol, for example, half of a symbol representing 10 will represent 5

Children count in twos, fives, and tens to complete and draw their own pictograms.

Mathematical Talk

If a symbol represents 2, how can you show 1 on a pictogram? How can you show 5? How can you show any odd number?

When would you use a picture to represent 10 objects?

Discuss with children that when using larger numbers, 1-1 correspondence becomes inefficient.

Varied Fluency

Use the tally chart to complete the pictogram.

Pet	Tally
Dog	ЖЖ ЖЖ
Cat	ЖЖ ЖЖ IIII
Rabbit	ЖЖ ЖЖ II
Fish	ЖЖ ЖЖ ЖЖ I

☐ = 2 animals

Use the information to complete the pictogram about the number of books read in each class.

Key

 = 5 books

Year 2 sell cakes at a bake sale. The tally chart shows the data.
Draw a pictogram to represent the data.

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Reasoning and Problem Solving

Create a pictogram to show who was born in what season in your class.

Use what you know about pictograms to help you.

Here is an example.

Spring	Summer	Autumn	Winter
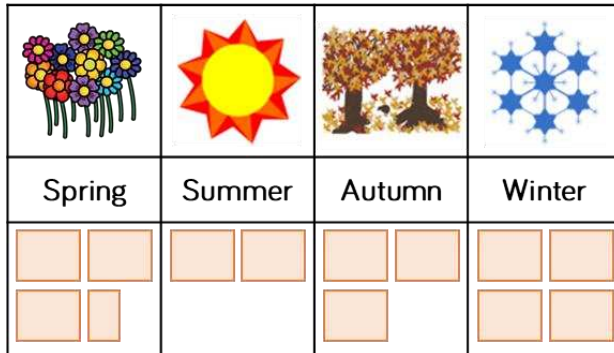
Key

☐ = 2 children

Teddy and Eva both draw a pictogram to show how many cars they counted driving past their school.

| Blue | Red | Silver | Black | Green |

🔵 = 5 cars

Colour	Number on cars
Blue	🔵🔵
Red	🔵🔵🔵
Silver	🔵
Black	🔵🔵🔵
Green	🔵🔵

🔵 = 10 cars
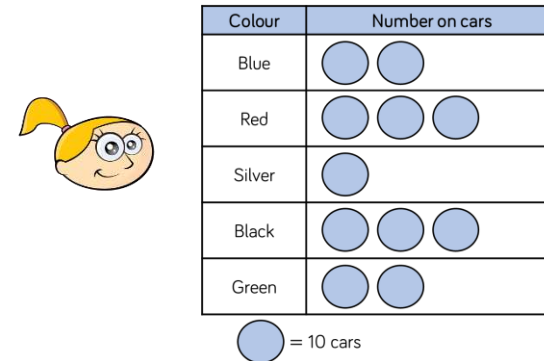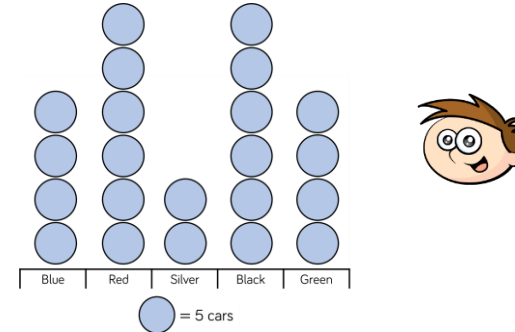
What is the same? What is different? Whose pictogram do you prefer? Why?

Possible answer. Same – both pictograms show the same information. Both easy to read. Both used circle. Both are in the same order.

Different – Eva counts in 10s, Teddy counts in 5s Teddy's is vertical and Eva's is horizontal.

Interpret Pictograms (2, 5 & 10)

Notes and Guidance

To help children to fully understand pictograms, it is important they have collected their own data previously in tally charts and constructed larger scale pictograms practically. Children also need to be able to halve 2 and 10

It is important the children are exposed to both horizontal and vertical pictograms.

Mathematical Talk

How can we represent 0 on a pictogram?

What does the pictogram show? What doesn't it show?

What is each symbol worth?

Varied Fluency

How many more sparrows are there than robins?
What is the total number of birds?
How did you calculate this?
Can you think of your own questions to ask a friend?

= 5 birds
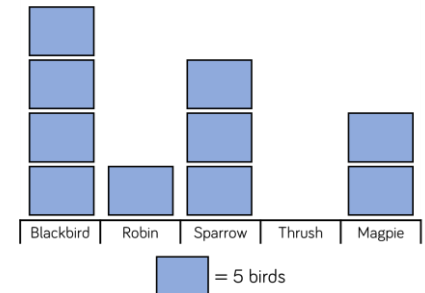
Which is the most popular sport?
How many children voted for football and swimming altogether?
What could the title of this pictogram be?

Sport	
Football	△ △ △ △ △
Tennis	△ △
Basketball	△ △ △
Hockey	△ △ △ ◿
Swimming	◿

△ = 2 children
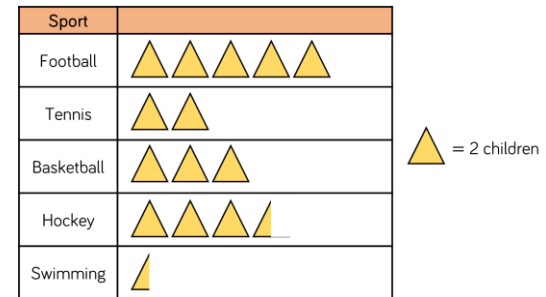
Use the pictogram to decide if the statements are true or false.

Animal	Number on farm
Pigs	★ ★ ★ ★ ★
Sheep	★ ★ ★ ★ ◿
Horses	★
Chickens	★ ★ ★ ◿
Cows	★ ★ ★ ★ ★ ★ ★

★ = 10 animals

Statement	True or False?
Horses were the least popular animal.	
The number of chickens seen was half the number of cows seen.	
The total amount of pigs and sheep is 70	
There were 8 cows on the farm.	
There were 10 fewer chickens than sheep.	

Jack and Whitney have carried out a traffic survey.

Van	
Bus	
Bike	
Lorry	
Car	
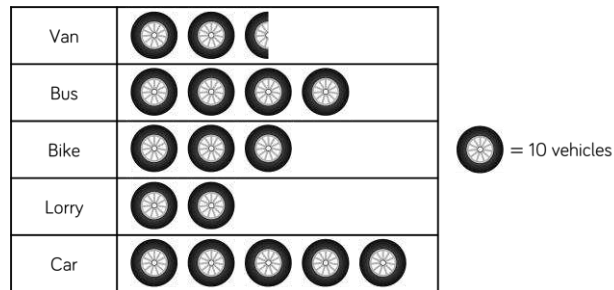
= 10 vehicles

Jack says;

If I add the number of lorries and bikes together then it will be equal to the number of cars

Is he right? Convince me.

Whitney says;

*To find the total number of vehicles I need to count the symbols. There are 16 and a half vehicles.*

Is she correct? Explain your answer.

Jack is correct because there are 20 lorries and 30 bikes. That means there are 50 lorries and bikes altogether. This is the same as the number of cars.

Whitney is incorrect because she has ignored the key.

That means there will be 165 cars, not 16 and a half.

Ice creams sold in a week
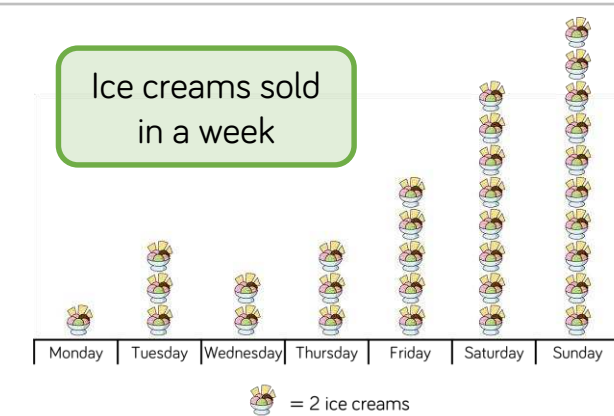
= 2 ice creams

Convince me

There are more ice-creams sold at the weekend than during the rest of the week.

True or False (Why?)

Three ice creams were sold on Tuesday.

Justify

If the staff needed to pick one day to have off during the week, which would be the best day and why?

There were 36 ice creams sold at the weekend and only 28 sold during the rest of the week.

There were not 3 ice creams sold on Tuesday, there were 6 sold. One symbol represents 2 ice creams.

The best day off would be Monday because that is the day they sold the least amount.

Block Diagrams

Notes and Guidance

Moving from concrete to pictorial, children build block diagrams using cubes and then move to drawing and interpreting block diagrams.

Children use their knowledge of number lines to read the scale on the chart and work out what each block represents.

Children ask and answer questions using their addition, subtraction, multiplication and division skills.

Mathematical Talk

Can you draw a block diagram to represent the data? What will each block be worth?

Can you make a block diagram to show favourite colours in your class?

Can you create your own questions to ask about the block diagram?

Varied Fluency

Class 4 are collecting data about favourite colours.

Colour	Number of children
Red	5
Green	8
Blue	7
Yellow	2

Make a block diagram using cubes to represent the data. Now draw the block diagram. What will the title be? Remember to label the blocks and draw a clear scale.

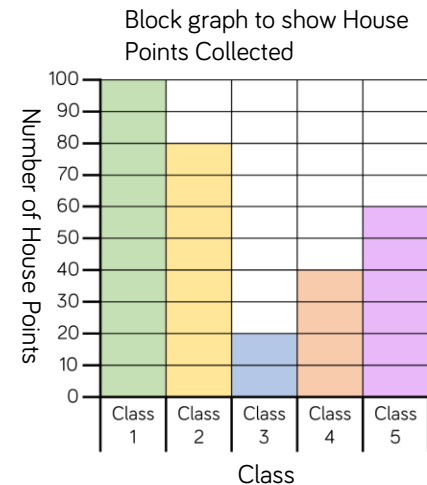5 classes collected their house points. Here are their results.
Which class collected the most house points?
Which class collected the fewest house points?
How many more points did Class 2 get than Class 4?
How many fewer points did Class 3 get than Class 5?
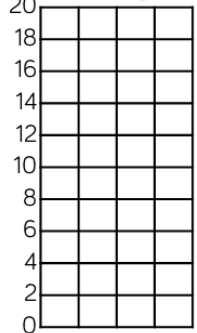How many points did Class 2 and Class 3 get altogether?

Block graph to show House Points Collected

Block Diagrams

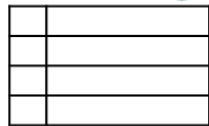## Reasoning and Problem Solving

Here are three tables of data.
Which set of data could you display using the block graph?
Which could use the pictogram?
Which could use the tally chart?
Explain your reasoning.

Data Set 1

Team	Goals scored
A	20
B	32
C	27
D	16

Data Set 2

Player	Points
1	20
2	65
3	80
4	45

Data Set 3

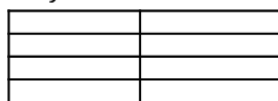| Name	Score
Ron	20
Eva	12
Amir	6
Mo	16

Block diagram

20
18
16
14
12
10
8
6
4
2
0

Pictogram ⬤ = 10

Tally Chart

Data Set 3 would best suit the block diagram because the numbers are all under 20

Data Set 2 would best suit the pictogram because the numbers are larger but all multiples of 5 or 10

Data Set 3 would best suit the tally chart because some numbers are larger than 20 but not all multiples of 5 or 10

Split into groups.
Everyone needs to write their name on a sticky note.
Use your sticky notes to create a block diagram to answer each question.

- How many boys and how many girls are there in your group?
- Which month has the most birthdays for your group?
- What is your favourite sport?

What other information about your group could you show?

Possible examples:

Boys   Girls

Gymnastics   Swimming   Football