

Summer Block 3

Statistics

Small steps

Step 1

Make tally charts

Step 2

Tables

Step 3

Block diagrams

Step 4

Draw pictograms (1–1)

Step 5

Interpret pictograms (1–1)

Step 6

Draw pictograms (2, 5 and 10)

Step 7

Interpret pictograms (2, 5 and 10)

Make tally charts

Notes and guidance

In this block, children are introduced to statistics and different representations of data for the first time. In this small step, they use tally charts to systematically record data.

It is important that children understand how different numbers are represented and when to use a “gate” to represent a group of 5. They should already be confident counting in 5s, and should use this skill when finding the totals represented by tallies. When they are confident in working out totals from tallies, they move on to drawing tallies for themselves to record numbers of objects.

Tallies are used throughout this block, so children must be confident using them before moving on to the next step.

Things to look out for

- Children may draw five individual lines rather than using a “gate”.
- Children may count the groups of 5s as 10s or 1s.
- If looking at pictures, children may need efficient strategies to avoid counting an object more than once.
- Children may think that they need to draw something to represent zero.

Key questions

- What is a tally chart?
- How do you show 1, 2, 3, 4 in a tally?
What happens when you show 5?
How do you show 15? How do you show 17?
- What number does the tally show? How do you know?
- How do you show zero as a tally?
- Why are tally charts useful? When would you use a tally chart?
- How can you avoid counting an object more than once?

Possible sentence stems

- To show _____ as a tally, I need to draw _____ groups of 5 and _____ single lines.
- The tally chart shows _____ groups of 5 and _____ single lines.
The total is _____

National Curriculum links

- 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

Make tally charts

Key learning

- What do you notice about the tallies?



Why do you think we group 5 together?

- Draw tallies for the numbers.



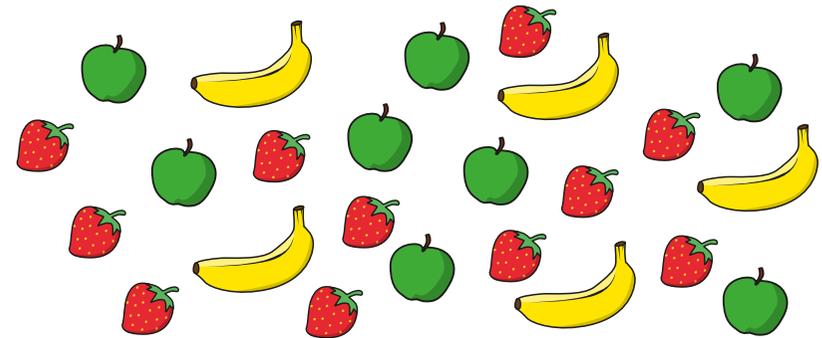
- Complete the tally chart.

Favourite colour	Tally	Total
blue		
red		
yellow		

- Complete the tally chart.

Year group	Tally	Total
Year 1		15
Year 2		19
Year 3		

- Complete the tally chart for the fruit.



Fruit	Tally	Total
apple		
strawberry		
banana		



Ask children to collect their own data and create a tally chart. Possible topics include:

- favourite colour
- favourite sport
- how children travel to school

Make tally charts

Reasoning and problem solving

Tiny draws a tally chart to show how children in Class 2 get to school.



Journey to school	Tally	Total
walk		7
cycle		2
bus	###	4
car	###	6



What mistakes has Tiny made?

Correct Tiny's mistakes.

How many children are there in Class 2?

Tiny has missed the gate from 7

|
4 should not have a gate
||||

19

Here is a tally chart showing some children's favourite colours.



Favourite colour	Tally
red	###
green	
blue	### ### ### ###
yellow	

yellow: any number less than 9
green: any number between 9 and 21

- Yellow is the least popular colour.
- The number of children who like green is greater than the number who like red, but less than the number who like blue.

Complete the tally chart.

Is there more than one answer?



Tables

Notes and guidance

In this small step, children explore the use of simple tables. Some of these include tallies, but others just show the totals.

Children can compare tally charts and tables and think about when it is more efficient to use each one. They may come to understand that a table is easier to read, but a tally chart is more efficient when collecting data.

Children think about what the data represents and draw pictures to match the information shown in a table, or use a picture to create a table. They should also begin to compare and answer questions about the data shown. This is built upon in the next steps, where they interpret block diagrams and pictograms.

Things to look out for

- Children may use tallies when they are not needed.
- Children may find it difficult to represent data from a table.
- Children may miscount when collecting data to put in a table.
- Children may need support to identify key information when answering comparative questions.

Key questions

- How are tally charts and tables similar? How are they different?
- When is it better to use a tally chart?
- When is it better to use a table?
- Which _____ is the most/least popular? How can you tell?
- How can you use tallies to complete a table?

Possible sentence stems

- The tally shows _____ groups of 5 and _____ single lines. The total is _____
- _____ people chose _____

National Curriculum links

- 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

Tables

Key learning

- Look at the tally chart and table.

Item	Tally
pencil	
rubber	
ruler	

Item	Total
pencil	30
rubber	15
ruler	21

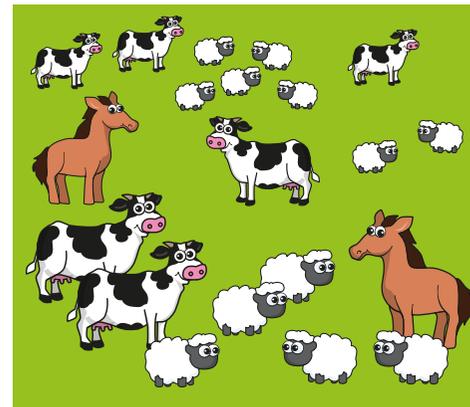
What is the same? What is different?

Which do you find easier to understand?

- Draw a picture to show the information in the table.

Shape	Total
square	4
triangle	8
circle	2

- Use the picture to complete the table.



Animal	Total
cow	
horse	
sheep	

- Here is a table showing the pets owned by children in Class 2

Pet	Total
cat	11
dog	14
hamster	7

- ▶ Which pet is most common? Which pet is least common?
- ▶ How many cats and hamsters do children in Class 2 have?
- ▶ How many pets do children in Class 2 have altogether?
- ▶ How many more dogs than hamsters are there?

Tables

Reasoning and problem solving

Tiny wants to record the colours of cars that pass by.



I think that tables are easier to understand than tally charts, so I will use a table to collect my data.



Do you think that this is a good idea?
Why?

No
A tally chart is better for collecting data when all the data cannot be seen at the same time.

The table shows the number of pieces of fruit in a box.

Some of the information is missing.

Fruit	Total
bananas	
apples	12
oranges	
pears	10

- There are 5 fewer bananas than apples.
- The number of oranges is greater than the number of pears but less than the number of apples.

Complete the table.

How many pieces of fruit are there altogether?

7 bananas,
11 oranges

40

Block diagrams

Notes and guidance

In this small step, children are introduced to block diagrams as a way of representing data. This is a new concept and it may be beneficial to explore the similarities/differences between this and previous representations of data.

Children explore block diagrams that use one-to-one correspondence, where each block represents one item. They will develop this idea when looking at bar charts with scales in later years.

Children identify simple information from a block diagram, for example using the heights/lengths of the bars to identify the most/least popular items. Stem sentences can be used to support interpretation of diagrams. Children can then create their own block diagrams, firstly using concrete resources such as cubes or sticky notes, and then by drawing on paper. Explain that block diagrams can be shown vertically or horizontally.

Things to look out for

- Children may not use/draw blocks of equal size.
- Children may not use the size of the bars to compare totals.
- Children may need support to label their block diagrams.

Key questions

- How is a block diagram similar to a tally chart/table? How is it different?
- What does each block represent?
- What information can you find out from the block diagram?
- How do you know which item is the most popular? How can you tell without counting?
- How could you show this data in a block diagram?

Possible sentence stems

- There are _____ blocks shaded.
This means that _____ people chose _____
- The most/least popular item is _____ because ...

National Curriculum links

- 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

Block diagrams

Key learning

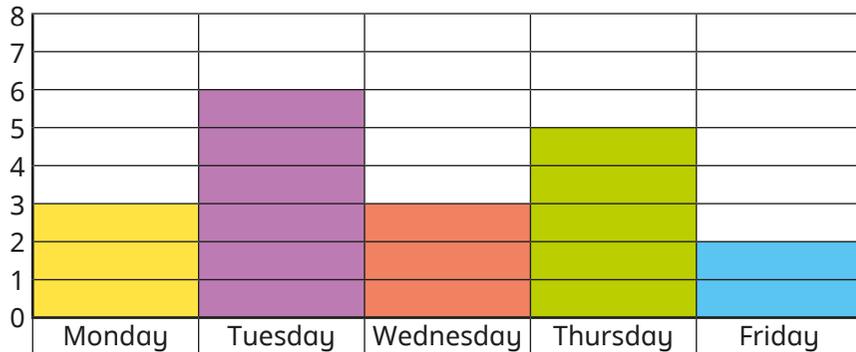


Give every child a sticky note and ask them to write their name on it.

Use the sticky notes to create block diagrams showing:

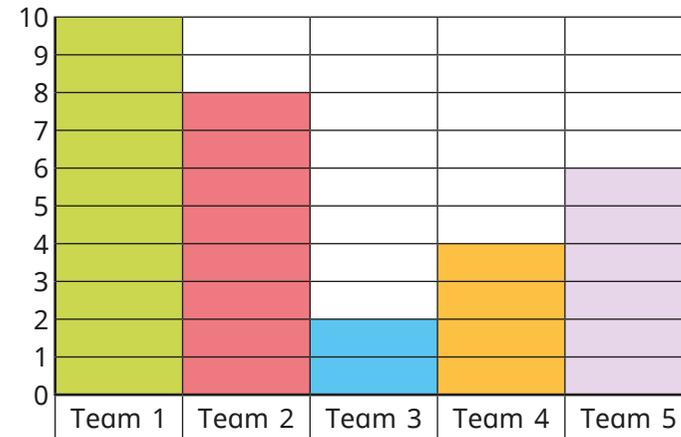
- the month with the most birthdays
- children’s favourite sports

- The block diagram shows how many children went to after-school club each day.



- ▶ On Monday, _____ children went to after-school club.
- ▶ The day with the most children was _____
- ▶ The day with the fewest children was _____
- ▶ On _____ and _____, the same number of children went to after-school club.

- The block diagram shows the number of house points each team got.



- ▶ How many more points did team 2 get than team 4?
- ▶ How many fewer points did team 3 get than team 5?
- ▶ How many points did team 2 and team 3 get altogether?
- Year 2 are collecting data about their favourite colours.

Colour	Total
red	5
green	8
blue	7
yellow	2

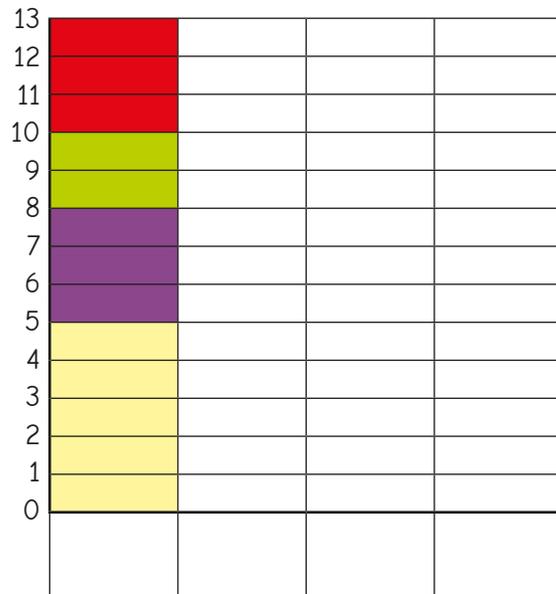
Make a block diagram, using cubes to show the data.

Now draw the block diagram.

Block diagrams

Reasoning and problem solving

Tiny makes a block diagram to show children's favourite colours.



Tiny has not made a separate column for each colour.

What mistake has Tiny made?

Why is Tiny's block diagram difficult to understand?



Match the tables to the block diagrams.

A

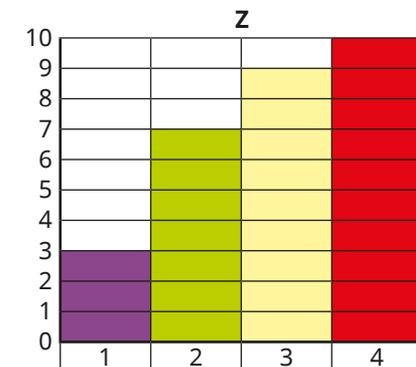
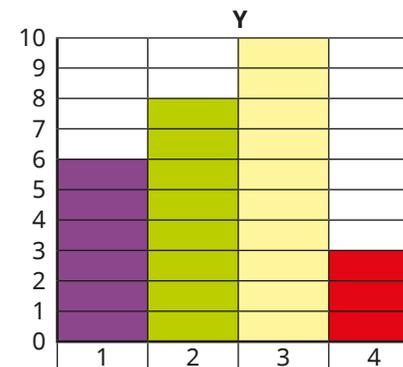
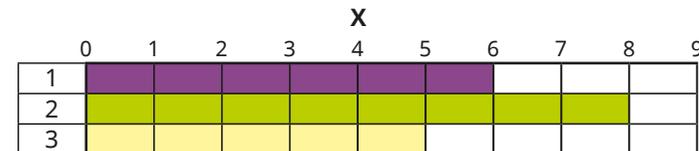
	Total
1	6
2	8
3	10
4	3

B

	Total
1	6
2	8
3	5

C

	Total
1	3
2	7
3	9
4	10



A – Y

B – X

C – Z

Draw pictograms (1–1)

Notes and guidance

In this small step, children are introduced to pictograms as a way of representing data. The first pictograms they draw use one-to-one correspondence, where each symbol represents one item.

Children could use physical objects to create 3-D pictograms before drawing them. Ensure that they encounter both horizontal and vertical pictograms. Emphasise the need to use the same symbol for every category, and that symbols need to be easy to draw.

Keys are introduced to aid understanding and to avoid potential misconceptions later in the block when one symbol can represent 2, 5 or 10

Things to look out for

- Children may draw different symbols to represent the different categories and may draw symbols inconsistently, for example using different sizes.
- Children may pick symbols that are difficult to replicate consistently.
- Children may think pictograms can only be shown horizontally/vertically.

Key questions

- What does each symbol represent?
- How many symbols do you need to draw in the row/column for _____?
- How can you tell which is the most popular without counting?
- What is a key? Why is it important?
- What would/would not be a sensible symbol to use? Why?
- Why do you use the same symbol for each category?

Possible sentence stems

- The key shows that 1 _____ = 1 _____
_____ children chose _____, so I need to draw _____ symbols.

National Curriculum links

- 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

Draw pictograms (1–1)

Key learning

- Here is a pictogram showing the number of goals each person scored in a football match.

Key = 1 goal

Player	Goals scored
Ann	
Jo	
Mo	
Ron	
Dan	

How are pictograms different from block diagrams?
How are they similar?

Complete the pictogram to show that Dan scored 5 goals.

- Use the tally chart to complete the pictogram.

Key = 1 piece of fruit

Fruit	Tally
banana	
grape	
pear	
apple	

Fruit	Number
banana	
grape	
pear	
apple	

- Use the key to complete the pictogram.

Key = 1 ice cream

Flavour	Total
vanilla	8
chocolate	12
mint	7
strawberry	3

vanilla	chocolate	mint	strawberry

- Complete the pictogram.

Key = 1 person

Eye colour	Number	Total
green		5
blue		
brown		9
grey		



Ask children to collect their own data and to draw a pictogram for it.

Remind them to include a key.

Draw pictograms (1–1)

Reasoning and problem solving

Tiny goes on a shape hunt and uses the data to make a pictogram.

Shape	Number of shapes
circle	
rectangle	
square	
triangle	



I saw the same number of squares and rectangles.

Do you agree with Tiny?
Explain your reasons.



No

Use the clues to help you complete the pictogram.



Flavour	Number sold
strawberry	
vanilla	
chocolate	
mint	
caramel	
bubblegum	

Key

= 1 ice cream

- The number of caramel ice creams sold was more than the number of bubblegum, but less than the number of strawberry.
- There were half as many mint ice creams sold as there were chocolate.
- Fewer vanilla ice creams were sold than mint ice creams.

Is there more than one way to complete the pictogram?



vanilla 1 or 0

mint 2

caramel 5, 6 or 7

Interpret pictograms (1–1)

Notes and guidance

In this small step, children interpret data from pictograms. Both vertical and horizontal pictograms should be explored.

Children will be aware of the key features of a pictogram and how to interpret a key from the previous step. Each symbol in the pictogram still represents one item.

Children start by identifying totals for different categories before comparing totals. As the numbers used are often small, this offers a good opportunity to revisit number bonds and mental methods of calculation. Children should be encouraged to look for multiple ways to make comparisons that can sometimes be done just by looking, counting the difference and also subtraction. They could think about the “story” the data tells them and infer information that is not directly shown.

In the next steps, children use these skills to draw and interpret pictograms with different keys.

Things to look out for

- Children may need to have strategies modelled for them, particularly when answering multi-step problems.
- Children may think that if there is nothing drawn for a category, then it is unfinished rather than representing zero.

Key questions

- What is a pictogram?
- What do you know? What can you find out?
- Which category was the most/least popular?
- What is a key? Why is it important?
- How many more people chose _____ than _____?
- How many _____ are there in total?

Possible sentence stems

- There are _____ symbols. This stands for _____ people.
- I can find the total by adding together _____ and _____
- _____ more/fewer people chose _____ than _____

National Curriculum links

- 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

Interpret pictograms (1-1)

Key learning

- The pictogram shows the favourite fruit of children in Year 2

apple	
banana	
pear	
strawberry	

Key
 = 1 child

What do you know? What can you find out?

- The pictogram shows the number of children in each class who ride a bicycle to school.

Class	Number of children
Class 1	
Class 2	
Class 3	
Class 4	
Class 5	

Key
 = 1 child

Complete the sentences.

- ▶ In Class 1, _____ children cycle to school.
- ▶ In Class 2, _____ children cycle to school.
- ▶ In Class 4, _____ child cycles to school.
- ▶ In total, _____ children cycle to school.

- The pictogram shows the number of minibeasts that Class 2 see on a bug hunt.

Minibeast	Number of minibeasts
spider	
ladybird	
centipede	
worm	

Key
 = 1 minibeast

Complete the sentences.

- ▶ There are _____ centipedes and worms altogether.
- ▶ There are _____ more spiders than ladybirds.

What else does the pictogram tell you?

- The pictogram shows Class 2's favourite colours of T-shirt.

Colour	Number of children
blue	
green	
red	
purple	

Key
 = 1 child

- ▶ What is the most popular colour of T-shirt?
- ▶ How many more children voted for blue than for red?
- ▶ How many children are there in Class 2?

Interpret pictograms (1–1)

Reasoning and problem solving

The children of Class 2 vote for their favourite colour.

Tiny draws a pictogram to show the results.

Colour	Number of children
blue	● ● ● ●
red	● ● ●
yellow	● ● ● ● ●
green	● ● ● ● ● ● ●



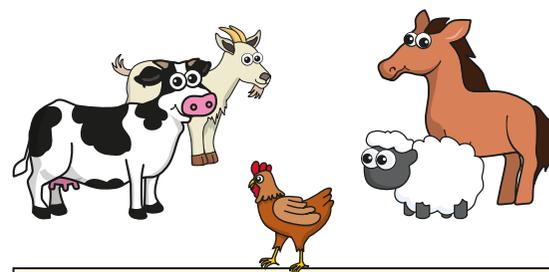
The most popular colour is blue.

Do you agree with Tiny?
Why?



No

Tom writes these statements about a pictogram.



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

Draw the pictogram.

Compare answers with a partner.



multiple possible answers, e.g.
chickens 12
cows 6
sheep 3
goats 8
horses 3

Draw pictograms (2, 5 and 10)

Notes and guidance

In this small step, children draw pictograms where the symbols represent 2, 5 or 10 items. From the previous steps, children should have a secure understanding of how to draw pictograms and what the key represents. They also need to be confident counting in 2s, 5s and 10s.

Children start this step by considering examples of data where symbols representing one item are not appropriate, as they would take a long time to draw and take up too much space. Initially, children are given keys to use, but they then move on to choosing the most appropriate key depending on the data. They also need to interpret what number is represented by half a symbol.

Things to look out for

- Children may be reluctant to use either 2s, 5s or 10s and prefer to stick to a count they are confident with, even if it is not the most appropriate.
- Children may need support to understand the use of part-symbols, for example if 1 symbol = 10, then half a symbol = 5
- Children may choose symbols that are not easily halved.

Key questions

- What is a key? Why is it important? What does the key show?
- What does each symbol represent? How do you know?
- Why should you use the same symbol for each category?
- Will each symbol in your key represent 1, 2, 5 or 10 items? How will you decide?
- If the key shows that 1 symbol stands for 2/10 people, how will you show 1 person/5 people?

Possible sentence stems

- The key shows that 1 symbol = _____ people.
To show _____ people, I need to draw _____ symbols.
- The greatest number of items is _____, so I will choose 1 symbol = _____ items.

National Curriculum links

- 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
- Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers

Draw pictograms (2, 5 and 10)

Reasoning and problem solving

Here is the start of a pictogram showing when some children were born.



Key ● = 10 children

● ●		
January	February	March

February: 30
March: 15

Use the clues to complete the pictogram.

- 5 fewer children were born in March than in January.
- Twice as many children were born in February as in March.

Mo and Sam draw pictograms to show how many cars they see.

Mo

Key ● = 5 cars

● ● ● ●	● ● ● ● ● ●	● ●	● ● ● ● ● ●	● ● ●
blue	red	silver	black	green

Sam

Key ● = 10 cars

Colour	Number of cars
blue	● ●
red	● ● ●
silver	●
black	● ● ●
green	● ●

What is the same? What is different?
Whose pictogram do you prefer?



multiple possible answers, e.g.

same: same information; circle symbols; colours in the same order

different: counting in 5s and 10s; vertical and horizontal

Interpret pictograms (2, 5 and 10)

Notes and guidance

In this small step, children interpret pictograms where the symbols represent 2, 5 or 10 items. Again, the pictograms may be presented either vertically or horizontally and children should now be familiar with both.

Children encountered how to interpret part symbols in the previous step, but this is challenging and may need some reinforcement. Questions include reading from a single row/ column of a pictogram, making comparative statements and solving simple multi-step problems.

At this point, children may start to make inferences and consider more contextual questions such as “Why do you think that the data shows this?”

Things to look out for

- Children may not use or may misread the key.
- Children may calculate the totals of items rather than using the pictogram to make comparisons.
- Children may need support to interpret part of a symbol.
- Children may think that if there is nothing in a column/ row, then it is unfinished rather than representing zero.

Key questions

- What do you know? What can you find out?
- What is a key? Why is it important? What does the key show?
- Which category is the most popular? Which is the least popular?
- How many more people chose _____ than _____?
- How many _____ are there in total?
- What would change if the key changed?

Possible sentence stems

- The key shows 1 symbol = _____ people.
So _____ symbols represent _____ people.
- The key shows 1 symbol = _____ people.
So half of a symbol represents _____ people.

National Curriculum links

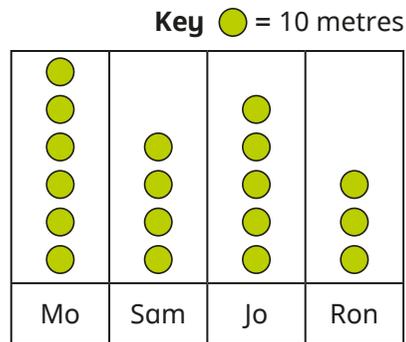
- Interpret and construct simple pictograms, tally charts, block diagrams and simple tables
- Ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity
- Ask and answer questions about totalling and comparing categorical data

Interpret pictograms (2, 5 and 10)

Key learning

- The pictogram shows how far children run in a game.

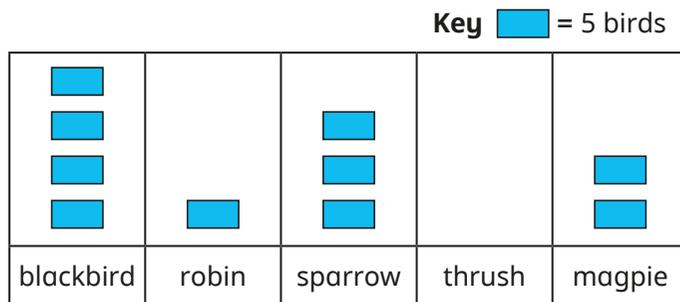
Complete the sentences.



Sam runs _____ metres.
 _____ runs the furthest distance.
 _____ runs the shortest distance.
 Altogether they run _____ metres.

What else can you find out?

- The pictogram shows how many birds Ben sees on a walk.



- ▶ How many more sparrows does he see than robins?
- ▶ How many more blackbirds than magpies does he see?

How did you work these out?

- Here is a pictogram showing children's favourite sports.

Key ▲ = 2 children

Sport	Number of children
football	▲▲▲▲▲
tennis	▲▲
basketball	▲▲▲
hockey	▲▲▲▲
swimming	▲

- ▶ How many children voted for either football or swimming?
- ▶ How many fewer children voted for tennis than for hockey?

- Use the pictogram to decide if the statements are true or false.

Key ★ = 10 animals

Animal	Number on farm
sheep	★ ★ ★ ★ ★
horse	★
chicken	★ ★ ★ ★
cow	★ ★ ★ ★ ★ ★ ★ ★

There are 8 cows on the farm.

There are 55 sheep and horses in total.

The number of chickens is half the number of cows.

Interpret pictograms (2, 5 and 10)

Reasoning and problem solving

Max and Kim count the traffic they see.
They draw a pictogram.

Key = 10 vehicles

van	
bus	
bike	
lorry	
car	



Max

The total number of lorries and bikes is equal to the number of cars.

There are 16 and a half vehicles.



Kim

Do you agree with Max and Kim?
Explain your answer.



Max – yes
Kim – no

The pictogram shows the number of ice creams sold in one week.

Key = 2 ice creams

Mon	
Tue	
Wed	
Thur	
Fri	
Sat	
Sun	

Is the statement true or false?

More ice creams were sold at the weekend than during the rest of the week.

Explain your answer.



True