Reasoning and Problem Solving
Step 1: Pictograms

National Curriculum Objectives:

Mathematics Year 3: (3S1) Interpret and present data using bar charts, pictograms and tables
Mathematics Year 3: (3S2) 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

Differentiation:

Questions 1, 4 and 7 (Reasoning)
Developing Explain whether the tally chart has been interpreted correctly in the pictogram. Using 1:1, 1:2 and 1:10 correspondence. No half pictures.
Expected Explain whether the tally chart has been interpreted correctly in the pictogram. Using 1:1, 1:2, 1:5 and 1:10 correspondence. Including half pictures.
Greater Depth Explain whether the tally chart has been interpreted correctly in the pictogram. Using 1:1, 1:2, 1:3, 1:5 and 1:10 correspondence. Including half pictures.

Questions 2, 4 and 8 (Problem Solving)
Developing Use the clues to work out how many images could be missing from the pictogram. Using 1:1, 1:2 and 1:10 correspondence. No half pictures.
Expected Use the clues to work out how many images could be missing from the pictogram. Using 1:1, 1:2, 1:5 and 1:10 correspondence. Including half pictures.
Greater Depth Use the clues to work out how many images could be missing from the pictogram. Using 1:1, 1:2, 1:3, 1:5 and 1:10 correspondence. Including half pictures.

Questions 3, 6 and 9 (Reasoning)
Developing Use the pictogram to explain whether the statement is correct. Using 1:1, 1:2 and 1:10 correspondence. No half pictures.
Expected Use the pictogram to explain whether the statement is correct. Using 1:1, 1:2, 1:5 and 1:10 correspondence. Including half pictures.
Greater Depth Use the pictogram to explain whether the statement is correct. Using 1:1, 1:2, 1:3, 1:5 and 1:10 correspondence. Including half pictures.

More Year 3 and Year 4 Statistics resources.

Did you like this resource? Don't forget to review it on our website.

Pictograms

1a. True or false? The pictogram below shows the results of the tally chart. Explain your answer.

Colour	Number of Children
Red	𝍸 |||
Blue	||||
Green	𝍸 𝍸 |
Yellow	𝍸

Colour	Number of Children
Red	●●●●●●
Blue	●●●●
Green	●●●●●●●
Yellow	●●●●●

Key: ◯ = 1 child

D 3 R

1b. True or false? The pictogram below shows the results of the tally chart. Explain your answer.

Day	Number of Oranges Sold
Monday	𝍸
Tuesday	𝍸 𝍸
Wednesday	𝍸 ||||
Thursday	||||

Day	Number of Oranges Sold
Monday	●●
Tuesday	●●●●●●●
Wednesday	●●●●●●●●
Thursday	●●●●

Key: ◯ = 1 orange

D 3 R

2a. Julia is drawing a pictogram where one picture = 2 children.

Julia knows more children swim on Tuesdays than Mondays, but fewer children swim on Tuesdays than Thursdays.

Swimming	Number of Children
Monday	
Tuesday	
Wednesday	●●●●●
Thursday	●●●●●●

Complete the pictogram showing one of the possibilities.

D 3 PS

2b. James is drawing a pictogram where one picture = 2 children.

James knows more children play the keyboard than guitar, but fewer children play drums than recorder.

Instrument	Number of Children
Recorder	●●●
Guitar	●●●●●
Keyboard	
Drums	

Complete the pictogram showing one of the possibilities.

D 3 PS

3a. Ian draws a pictogram to show the minibeasts that Year 3 saw in the garden.

Minibeast	Number of Insects 1 picture = 10 insects
Worm	●●●●●●
Slug	●●
Snail	●
Ant	●●●●●●●●

We saw 40 worms.

Is he correct? Explain your answer.

D 3 R

3b. Amelia draws a pictogram to show when KS2 children have their birthday.

Month	Number of Birthdays 1 picture = 10 birthdays
January	●●
February	●
March	●●●●
April	●●●

4 children have their birthday in March.

Is she correct? Explain your answer.

D 3 R

Pictograms

4a. True or false? The pictogram below shows the results of the tally chart. Explain your answer.

Cakes Sold	Number of Cakes
Banoffee	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸
Red Velvet	𝍸 𝍸 𝍸 𝍸 ||||
Chocolate	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸
Carrot	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸

Cakes Sold	Number of Cakes
Banoffee	◯◯◯◯◯◯
Red Velvet	◯◯◯◯
Chocolate	◯◯◯◯◯◯◗
Carrot	◯◯◯◯◯◯◯

Key: ◯ = 2 cakes

E 3 R

Pictograms

4b. True or false? The pictogram below shows the results of the tally chart. Explain your answer.

Day	Number of Bananas Sold
Monday	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸
Tuesday	𝍸 𝍸
Wednesday	𝍸 𝍸
Thursday	𝍸 𝍸 𝍸 𝍸

Day	Number of Bananas Sold
Monday	◯◯◯◯◯◯◯◗
Tuesday	◯◯
Wednesday	◯◯
Thursday	◯◯◯◯

Key: ◯ = 2 bananas

E 3 R

5a. Filip is drawing a pictogram where one picture = 5 children.

Filip knows more children have blonde hair than ginger, but fewer children have blonde hair than black.

Hair Colour	Number of Children
Black	◯◯◯◯
Blonde	
Brown	◯◯◯◯◯◯
Ginger	

Complete the pictogram showing one of the possibilities.

E 3 PS

5b. Neetu is drawing a pictogram where one picture = 5 children.

Neetu knows more children have brown eyes than grey, but fewer children have green eyes than blue.

Eye Colour	Number of Children
Brown	
Blue	◯◯◯
Green	
Grey	◯◯◯◯◯◯

Complete the pictogram showing one of the possibilities.

E 3 PS

6a. Sue draws a pictogram to show KS2's favourite author. Each child voted once.

Author	Number of Children 1 picture = 10 children
Dahl	◯◯◯
Walliams	◯◯◯◯◯◯◯◯
Rowling	◯◯◯◯◯
Morpurgo	◯

A quarter of the number of children that voted Dahl, voted Morpurgo.

Is she correct? Explain your answer.

E 3 R

6b. Jay draws a pictogram to show KS2's favourite dessert. Each child voted once.

Dessert	Number of Children 1 picture = 10 children
Yoghurt	◯◯
Fruit	◯◯◯◯
Ice-cream	◯◯◯
Custard	◯

Half the number of children that voted fruit, voted custard.

Is he correct? Explain your answer.

E 3 R

Pictograms

7a. True or false? The pictogram below shows the results of the tally chart. Explain your answer.

Vegetable	Number of Vegetables Sold
Cabbage	𝍸
Broccoli	𝍸 𝍸 𝍸
Onions	𝍸 𝍸 𝍸 𝍸 𝍸
Carrots	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸

Vegetable	Number of Vegetables Sold
Cabbage	● ●
Broccoli	● ● ● ●
Onions	● ● ● ● ● ●
Carrots	● ● ● ● ● ● ● ◗

Key: ◯ = 5 vegetables

GD 3 R

Pictograms

7b. True or false? The pictogram below shows the results of the tally chart. Explain your answer.

Colour	Number of Tins of Paint Sold
White	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸
Grey	𝍸 𝍸 𝍸
Beige	𝍸 𝍸
Brown	𝍸

Colour	Number of Tins of Paint Sold
White	◯ ◯ ◯ ◯ ◯ ◯ ◗
Grey	● ● ● ●
Beige	●
Brown	● ●

Key: ◯ = 5 tins of Paint

GD 3 R

8a. Evie is drawing a pictogram where one picture = 10 children.

Evie knows more children like daisies than daffodils, but fewer children like daisies than roses.

Flowers	Number of Children
Rose	● ● ● ● ◗
Buttercup	● ● ● ● ● ◗
Daffodil	
Daisy	

Complete the pictogram showing one of the possibilities.

GD 3 PS

8b. Jakub is drawing a pictogram where one picture = 10 children.

Jakub knows fewer children like tigers than lions, but more children like elephants than lions.

Animal	Number of Children
Elephant	
Lion	
Tiger	● ◗
Hippo	◗

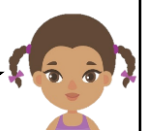
Complete the pictogram showing one of the possibilities.

GD 3 PS

9a. Mary draws a pictogram to show KS2's favourite type of PE. Each child voted once.

PE	Number of Children 1 picture = 3 children
Dance	● ● ● ●
Gym	● ● ● ● ● ●
Games	● ● ●
Athletics	● ● ● ●

A third of the number of children that voted gym, voted games.



Is she correct? Explain your answer.

GD 3 R

9b. Chen draws a pictogram to show KS2's favourite pet. Each child voted once.

Pet	Number of Children 1 picture = 3 children
Dog	● ● ● ● ● ● ●
Cat	● ● ● ● ● ● ●
Fish	● ●
Rabbit	● ● ●

A quarter of the number of children that voted cats, voted fish.

Is he correct? Explain your answer.

GD 3 R

Reasoning and Problem Solving Pictograms

Developing

1a. False. There should be 8 pictures for red and 11 pictures for green.

2a. Various answers, for example: 4 pictures for Monday and 5 pictures for Tuesday.

3a. No, they saw 60 worms.

Expected

4a. False. There should be 9 more pictures for banoffee, 8 more pictures for red velvet, 8.5 more pictures for chocolate and 13 more pictures for carrot.

5a. Various answers, for example: 3 pictures for blonde and 2 pictures for ginger

6a. No. A third of the number of children that voted Dahl voted Morpurgo.

Greater Depth

7a. False. There should be 1 fewer pictures for cabbage, broccoli and onions, but 0.5 more pictures for carrots.

8a. Various answers, for example: 4 pictures for daisies and 3 pictures for daffodils

9a. No. Half the number of children that voted gym, voted games.

Reasoning and Problem Solving Pictograms

Developing

1b. False. There should be 5 pictures for Monday, 10 pictures for Tuesday and 9 pictures for Wednesday.

2b. Various answers, for example: 6 pictures for keyboard and 1 picture for drums.

3b. No, 40 children have their birthday in March.

Expected

4b. False. There should be 7.5 more pictures for Monday, 3 more pictures for Tuesday, 3 more pictures for Wednesday and 6 more pictures for Thursday.

5b. Various answers, for example: 8 pictures for brown and 2 pictures for green

6b. No. A quarter of the number of children that voted fruit voted custard.

Greater Depth

7b. False. There should be 1.5 fewer pictures for white, 1 fewer pictures for grey, 1 more picture for beige and 1 fewer for brown.

8b. Various answers, for example: 3 pictures for lions and 4 pictures for elephants

9b. No. 6 is not a quarter of 21.