

# Reasoning and Problem Solving

## Step 1: Interpret Charts

### National Curriculum Objectives:

Mathematics Year 4: (4S1) [Interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs](#)

Mathematics Year 4: (4S2) [Solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs](#)

### Differentiation:

Questions 1, 4 and 7 (Reasoning)

**Developing** Consider scenarios for data collection and given options for presenting the data. Give reasoning for their choice of chart from pictogram, bar charts or tally.

**Expected** Consider scenarios for data collection and given options for presenting the data. Give reasoning for their choice of chart from pictogram, bar chart, tally or tables.

**Greater Depth** Consider scenarios for data collection and all options for presenting the data. Give reasoning for their choice of chart.

Questions 2, 5 and 8 (Reasoning)

**Developing** Simple true or false statements relating to pictograms and tally charts.

**Expected** True or false statements relating to bar charts and scales.

**Greater Depth** True or false statements relating to scales and axis.

Questions 3, 6 and 9 (Problem Solving)

**Developing** Spot one obvious improvement to a given pictogram or table.

**Expected** Spot two simple improvements to a given bar chart.

**Greater Depth** Spot two subtle improvements to a given table or bar chart.

More [Year 4 Statistics](#) resources.

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## Interpret Charts

1a. A toy shop are keeping track of how many toys they sell each month.

The staff are thinking how to collect the information.



Ali

I think a tally chart beside the till would be the best way.

I want to use a bar chart, with a different colour for each toy.



Lea



Who do you agree with and why?

R

## Interpret Charts

1b. The school tuck shop would like to know which fruit sells best.

The children are deciding how to record each sale.



Faith

A pictogram drawing each fruit as we sell it.

A bar chart, we can put a cross each time we sell a fruit.



Tom



Who do you agree with and why?

R

2a. True or false?

In a pictogram, you have to count the images and that is the value of the item, 10 car images is always worth 10 cars.

Explain your answer.



PS

2b. True or false?

It is important to be able to count in 5s if you are using a tally chart.

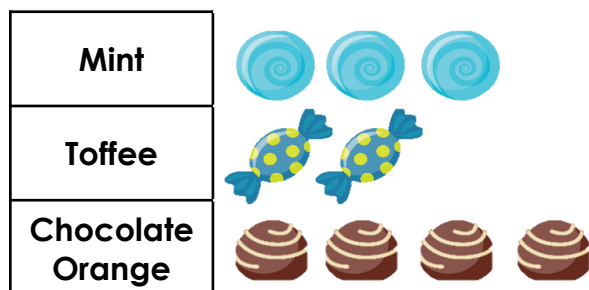
Explain your answer.



PS

3a. Mr Harrison says this pictogram is not easy to interpret.

*Favourite Sweets*



Find 1 way you could improve the pictogram.



R

3b. Mrs Bentley says this table is not easy to interpret.

*Frequency of Exercise*

| Age       | Daily | Weekly |    |
|-----------|-------|--------|----|
| Under 10s | 12    | 32     | 45 |
| 10 – 15   | 7     | 43     | 43 |
| 16 – 21   | 5     | 21     | 56 |
| 21 +      | –     | 54     | 72 |

Find 1 way you could improve the table.



R

## Interpret Charts

4a. The children are voting on the playground equipment to be bought.

Year 4 need to decide how to present the outcome.



Libby

I'm going to draw a pictogram.

I'm going to make a tally chart.



James



Who do you agree with and why?

R

## Interpret Charts

4b. Class 4S are collecting information about how children travel to school.

Year 4 need to decide how to present the data.



Fred

I'd like to use a bar chart.

I'm planning a table with the figures in.



Tina



Who do you agree with and why?

R

5a. True or false?

A bar chart must have lots of different colours.

Explain your answer.



PS

5b. True or false?

Your scale should always have a figure for each 10.

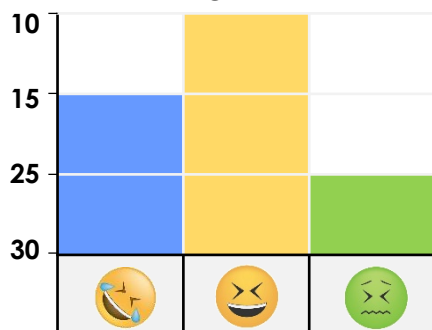
Explain your answer.



PS

6a. Miss Khan says this block graph is not easy to interpret.

*How dancing makes you feel*

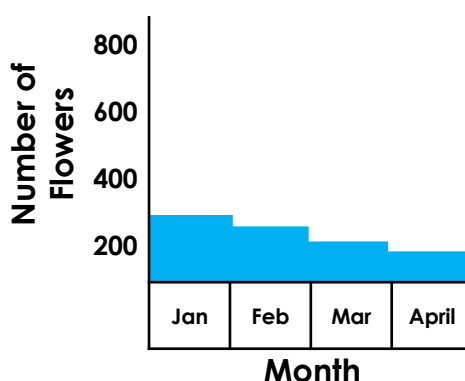


Find 2 ways you could improve the chart.



R

6b. Mr Mullaney says this bar chart is not easy to interpret.



Find 2 ways you could improve the chart.



R

## Interpret Charts

7a. The council want to know how many children are in year 3 in the 25 schools in the area.

They are deciding how to present the information.



Sophia

A tally chart would be best.

A table of numbers would be the best.



Si



Who do you agree with and why?

R

## Interpret Charts

7b. There is a traffic survey on the main road to assess the amount of traffic at peak times and lunch time.

How should they record the information?



Josie

I'm going to use a pictogram.

I think a bar chart would be best.



Dion



Who do you agree with and why?

R

8a. True or false?

The scale should always go up in ones or twos.



Explain your answer.

PS

8b. True or false?

If your chart has a title, then you don't need to label the axes.



Explain your answer.

PS

9a. Mrs Munroe says this table is not easy to interpret.

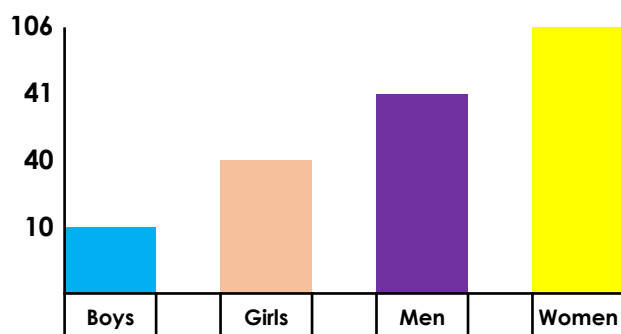
|         | Always | Sometimes |   |
|---------|--------|-----------|---|
| Mum     | 10     | 5         | 2 |
| Dad     | 12     |           | 1 |
| Grandma | 4      |           | 3 |
| Grandad | 5      | 14        | 2 |

Find 3 ways you could improve the chart.



R

9b. Mr Fallon says this bar chart is not easy to interpret.



Find 3 ways you could improve the chart.



R

## Reasoning and Problem Solving Interpret Charts

*For questions 1a, 4a & 7a children may give varying answers, their justification for why is the more important aspect.*

### Developing

1a. A tally chart is a quick way to gather data and a bar chart is a way to present the data.

2a. False. In a pictogram the image may have a value of more than 1 so you may have to count in 1s, 2s, 3s, etc.

3a. Show a key giving the value of each image.

### Expected

4a. A pictogram would be better to present the outcome and the tally chart would be good to collect the votes.

5a. False. A bar chart does not need to have lots of colour, however the colour can help to show the differences in the data.

6a. The scale must run from lowest value at the bottom to highest at the top. It makes comparing the data much easier. The axis should also be labelled as the meaning of the symbols isn't clear.

### Greater Depth

7a. A table with numbers is the best choice to see the precise data.

8a. False. The scale could have intervals of 1, 2 or any number provided that it is consistent.

9a. The final column in the table needs a title and the blank boxes would be better if they had 0 in otherwise it looks incomplete. It also needs a title.

## Reasoning and Problem Solving Interpret Charts

*For questions 1b, 4b & 7b children may give varying answers, their justification for why is the more important aspect.*

### Developing

1b. A bar chart with crosses would be best as they are quick to do as you sell fruit.

2b. True. As each group of tallies is worth 5, it is essential you can count well in 5s.

3b. Add a title to the last column.

### Expected

4b. Fred's idea would be better as it is easy to compare values on a bar chart.

5b. False. Your scale should have standard spacing but does not necessarily need 10, it will vary for your data.

6b. It needs a title. The scale is not appropriate for the data. It would be better to have 0 – 300 broken into smaller amounts as we can only see the values are around 200 but not specific values.

### Greater Depth

7b. A bar chart is the best choice. It should have a quick way to record, such as crosses (or a tally chart).

8b. False. The axes need to be labelled so that the data is clear and easy to read.

9b. Label the axis, give the chart a title, and the scale should also be evenly spaced.