

Can I interpret and explain data presented in line graphs?

Teaching guidance

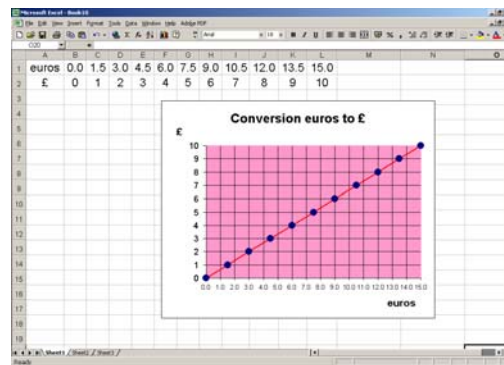
Key vocabulary

data, information, survey, questionnaire, graph, chart, table, scale, interval, division, half-division, horizontal axis, vertical axis, axes, label, title, line graph

Models and images and resources

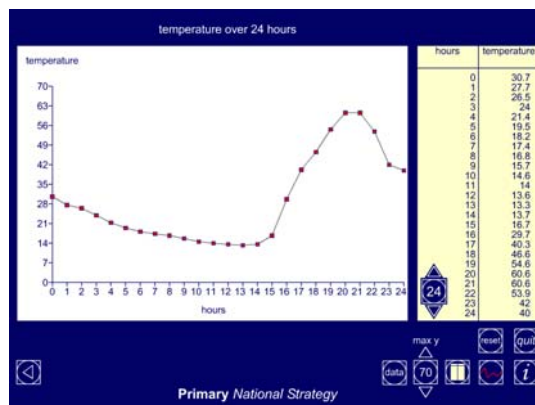
Conversion graphs

Use the information in the graph and a calculator to work out how many pounds (£) you would get for a given number of euros.

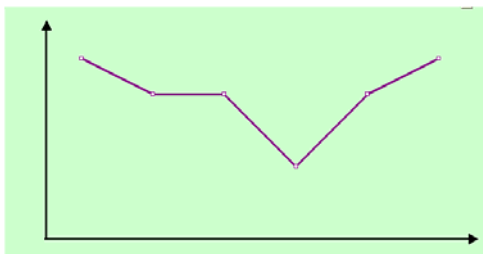


Line graph ITP

Select from existing data sets, amend these sets or create your own. These can then be amended and manipulated to show the impact on the graph.



Flexible line graph story spreadsheet



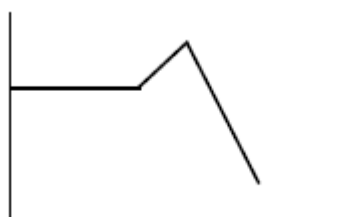
Use the spreadsheet to create different line graphs to rehearse the language of explanation and reasoning related to line graphs.

Teaching tips

- Encourage children to note the following parts of a line graph before answering any questions: title, labels on the axes, scales on the axes.
- You can remove one or more of these to encourage children to predict what they could be based on the information children have been given. For example, if it is a time–distance line graph about a bicycle journey, what would be an appropriate choice of scales?
- Encourage children to annotate line graphs, using a ruler to help them to make accurate readings:

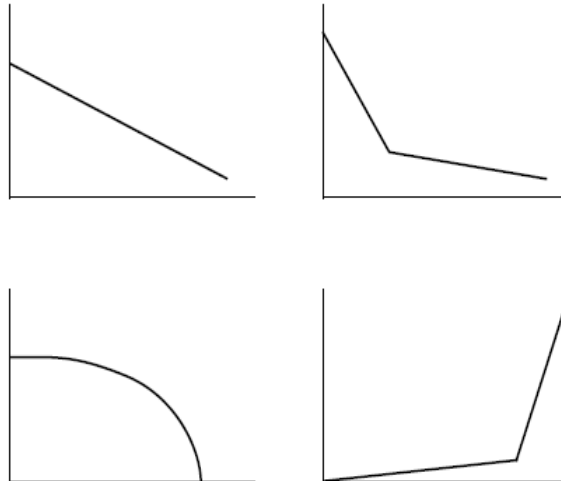


- Ensure that children can give examples of discrete and continuous data and explain the difference between the two, for example shoe sizes (discrete) versus the growth of a plant over time.
- Explore data where intermediate points do and don't have meaning. Ensure that children understand that line graphs should only be used to represent data where intermediate points do have meaning.
- Look at line graphs with no title or labelled axes and suggest stories that they could represent.

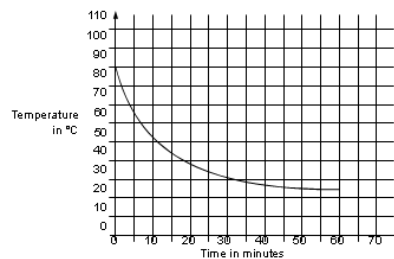


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Overcoming barriers level 4–5

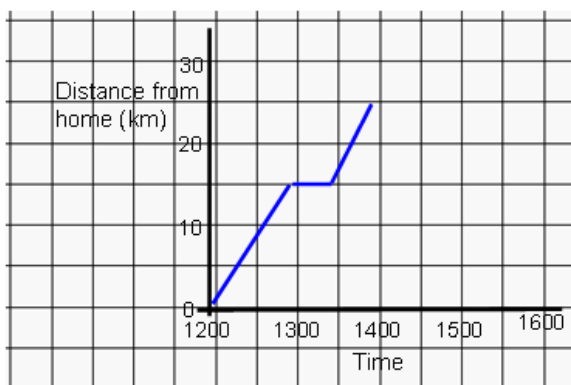
- Make links to science lessons. For example, ask children to imagine that the unlabelled graphs below represent an experiment. Ask:
 - Which of these graphs show that something is increasing? Be prepared to explain your thinking.
 - Which of these graphs show that something is decreasing? Be prepared to explain your thinking.
 - Indicate a point on a graph line where you think something might have changed suddenly.
 - What do you think a steep line might be showing?
 - What do you think an almost flat line might be showing?



- Interpret graphs where lines do not start at the origin. Why might this be?
 Can children think of more examples of line graphs that would not start from zero?

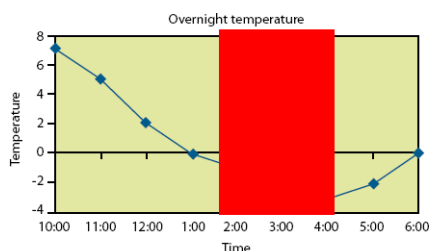


- Give children opportunities to complete unfinished line graphs. For example:
 Elizabeth went for a cycle ride. The distance–time graph shows her ride. She set off from home at 12:00 and had a flat tyre at 14:00. During her ride she stopped for a rest.
 - At what time did she stop for a rest?
 It took Elizabeth 15 minutes to repair the flat tyre. She then cycled home at 25 km per hour.
 - Complete the distance–time graph to show this information.



- Cover up part of a line graph and ask children to predict what is happening behind the covered part, giving reasons for their predictions.

This is also an opportunity to develop mathematical explanations.

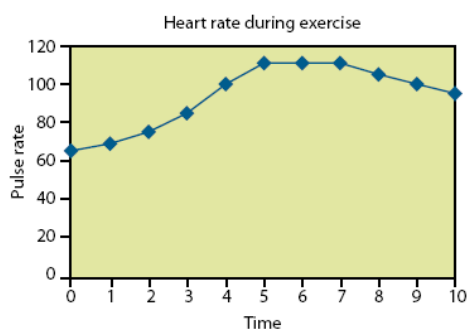


Navinder said,

'I think the temperature will fall dramatically during the early hours of the morning. The temperature will drop another 6 degrees after 1:00 am'

Do you agree with him? Explain what you think and give your reasons for your answer.

- Develop the use of vocabulary to describe line graphs. For example, ask children to use the words in the box below to describe the line graph that represents the effect of exercise on heart rate:



plummet	increase
peak	soar
rocket	fluctuate
level out	drop
decrease	decline
rise	fall

Ask children to reflect on the words they did not use, and to explain what the line would have to look like for particular words from the list to be used.

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- Model and demonstrate situations that emphasise the importance of scale in a line graph. For example, imagine a line graph to represent the increase in mass of a baby animal over 6 months. Consider how the graph would differ for the following animals: a mouse, an elephant, a dog.
- Instead of starting with a line graph, begin with the interpretation. For example, ask children to sketch a line graph with the title 'Bath time', based on the interpretation shown in the jumbled series of cards below.
 - Ask children how they think the axes should be labelled, explaining their answers.
 - Ask them to suggest scales and explain their choice.
 - Children then put the cards in the order that they think is correct and draw the graph based on this interpretation.
 - Then ask children to rearrange the order of some of the cards. How does this change the line graph? Ask children to explain their answers.

I let out some cold water and put in a bit more hot water.	I pulled out the plug.	The telephone rang so I went to answer it.
I got in the bath.	I added some bubble bath.	I turned on the bathroom light and got my towel ready.
I used the shower head to rinse my hair.	I relaxed in the warm water.	The water gurgled as it flowed down the drain.