Activity description

This activity introduces conversion graphs and direct proportionality in the context of currency conversion.

It focuses on reading and plotting graphs and calculating gradients. One question requires the use of a spreadsheet.

Suitability

Level 1 (Foundation)
or introductory activity for Level 2 (Higher)

Time

1–2 hours

Resources

Student information sheet.
Optional: spreadsheet, slideshow

Equipment

Graph paper, rulers, calculators.
Optional: computers

Key mathematical language

Line graph, axis, scale, points, gradient, conversion factor, conversion rate, direct proportion.

Notes on the activity

Before starting the activity, students need to know how to:

- plot a graph
- read values from a line graph
- scale axes appropriately for drawing their own graphs.

You may need to spend time on these skills first.

The slideshow can be used to introduce the activity and explain some of the information.

Use the conversion factor to draw up a table of values on the board before displaying the graph on the third slide. Whilst discussing the table with students, spend time extending the idea of proportionality beyond doubling before going on to consider the graph and its gradient.

Emphasise the requirements for direct proportionality – that the graph must be a straight line through (0, 0).

Students can then complete the 'Try these' questions.

During the activity

Question 3 in the 'Try these' section has conversion rates of varying difficulty. You may wish to guide students' choice of currency – see Extensions below. Students can self-check answers by using a calculator and the conversion factor.

The last question requires a spreadsheet to show that line graphs in Excel do not give what is needed, and that scatter graphs do. This could be demonstrated with a data projector if individual computers are not available. If you do not have access to computers you could delete this part of the activity.

Points for discussion

For the conversion graph for £ and $:

- What is the scale on each axis? Why must the graph go through (0, 0)?
- How could you use the graph to find out what $8 is in £s?
- Would you prefer to use the graph or a conversion factor to change between dollars and pounds?

More generally:

- How do you decide on the scale for the axes when you have to draw a graph yourself?
- In direct proportion, doubling one quantity doubles the other. Does the same rule work if you multiply by 3 or by 5?
- Have you ever used line graphs in other situations, such as science experiments, to find a relationship?

Extensions

Question 3 in the 'Try these' section has conversion rates of varying difficulty. Less able students could be asked to use New Zealand dollars at $2 = £1, whilst more able students use the euro at €1.08 = £1 which requires accurate plotting. Some of the other conversions will provide challenge in choice of axis scales.

Answers

1a £5. Students who give the answer £ 5.1 have probably used their calculator instead of reading the graph.

b £6.70

2b 100 km **c** 44 miles **d** 1 mile = 1.6 km.

3b £220 = 308 Australian $, 326 Canadian $, 13860 rupees,

28160 yen, 440 NZ $, 1276 riyal, 2244 rand, 238 euros.

4b £1.56 for 3 kg bag. **c** 52p per kilogram.