In this activity you will use line graphs to convert money from one currency to another.

You will also use a graph to convert distances from one unit to another.

After this activity, you should be able to use a conversion graph to:

* display a relationship that you already know between two sets of figures
* find out what the relationship is between two sets of figures.

Information sheet: Conversion graphs

Suppose the exchange rate between pounds and US dollars is £1 = $1.50  
Check the values in the table below:

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Pounds (£) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Dollars ($) | 1.50 | 3.00 | 4.50 | 6.00 | 7.50 | 9.00 | 10.50 | 12.00 | 13.50 | 15.00 |

Note that if you double the pounds, you double the dollars:

£2 gives you $3 and £4 gives you $6.

£5 gives you $7.50 and £10 gives you $15.

Think about…

Does the same thing happen if you multiply by 3 or 4?

**Every £1 always gives an extra $1.50**

Think about…

What is the scale on each axis? Why must the graph go through (0, 0)?

How can you use the graph to find out what $8 is in £s?

**15**

**10**

**Gradient =  = 1.5**

**Gradient** = 

The graph of these values is a straight line. It goes through (0, 0).

Because the graph has **both** of these things, you can say:

* As the pounds go up in equal steps, so do the dollars.
* The number of dollars is **directly proportional** to the number of pounds.
* From the gradient: the number of dollars = 1.5 × the number of £s.
* 1.5 is the **conversion factor** for this graph.

Think about…

Do you prefer to use a graph or a conversion factor to change between dollars and pounds?

How do you decide on the scale for the axes when you have to draw a graph yourself?

Try these

**1a** Use the conversion graph on the information sheet to convert roughly:

**i** £ 3.40 to dollars **ii** $10 to £s

**b** Use a calculator to check your answers.

**2** This table gives approximate conversions between miles and km

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| miles | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
| km | 16 | 32 | 48 | 64 | 80 | 96 | 112 | 128 | 144 | 160 |

**a** Draw a line graph to show this data.

**b** Use your graph to find out what 63 miles is in km.

**c** Use your graph to change 70 km to miles.

**d** Work out the gradient and use it to complete this statement: 1 mile = … km.

**3** This table gives the exchange rates for £1 in various currencies:

|  |  |  |  |
| --- | --- | --- | --- |
| Australia | $1.4 (dollars) | New Zealand | $2.0 (dollars) |
| Canada | $1.48 (dollars) | Saudi Arabia | 5.8 riyal |
| India | 63 rupees | South Africa | 10.2 rand |
| Japan | 128 yen | Eurozone | 1.08 euros |

**a** Choose a currency and draw a conversion graph for £0 – £500.

**b** Use your graph to find out what you would get if you changed £220.

**c** Work out the gradient of your graph. Check that it is the same as the conversion factor.

**4** This table gives the price of various bags of pre-packed potatoes.

At the end of the activity

Do you prefer to use a graph or a conversion factor to convert quantities from one unit to another?

If you have a direct proportion graph, 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?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Weight (kg) | 2 | 5 | 8 | 12 |
| Price (£) | 1.04 | 2.60 | 4.16 | 6.24 |

**a** Draw a line graph by hand.

**b** How much would you expect to pay for a 3 kg bag?

**c** Work out the gradient to give the price per kilogram

**d** Enter the same data into a spreadsheet and compare the printouts of a **line graph** and a **scatter diagram** drawn using this data. Which gives a correct graph?

**e** Do supermarkets usually price their bags of potatoes so that doubling the quantity doubles the price?