



Activity description

How much further is it by road than by helicopter? In this activity students plot graphs of real data to compare the straight-line distances between towns with the actual distance by road on the mainland of Britain.

Skills developed:

- Read distance tables from a road atlas.
- Measure distances on a map of the entire country and then use the scale to convert to miles.
- Plot a scatter graph of results (links to correlation).
- Use the gradient of a line of best fit to find an approximate rule to convert helicopter distances into road distances.

Suitability and Time

Level 2 (Intermediate/Higher), Level 1 (Foundation) with help

1–2 hours

Resources and equipment

Student sheets

Optional: slideshow, spreadsheet

Road atlases

Rulers, graph paper

Optional: internet access for route planner websites such as

<http://www.theaa.com/route-planner/index.jsp>

Key mathematical language

Scale, direct proportion, line of best fit, gradient

Notes on the activity

You may be able to borrow road atlases from geography or travel & tourism teachers. You need at least one for each pair of students.

Consider whether to work in miles or kilometres (the distance table will probably be in miles).

Check that there is a scale given for the map of the whole country. If not you will have to work it out beforehand! Be prepared to convert centimetres on the map to miles if necessary.

Less able students would benefit from a simple scale, for example 1 cm = 50 km, so you may decide to simplify the activity by using your local area, rather than the whole country.

Using a scale in the form of 1: 5 000 000 would provide an extra challenge for more able students.

During the activity

Use the slideshow to introduce the activity. Make it clear you are talking about distance and not time, you need to watch your language!

Make sure everyone understands and can read the road distance table.

Can everyone use the map scale to work out the distance by helicopter from the nearest big city to another one?

Does everyone know how to create a suitable table of results? (Could be on paper or in a spreadsheet.)

Can everyone plot a scatter graph, and use the line of best fit and the gradient to come up with a rule to convert helicopter distances to road distances?

Students can work in pairs or individually.

Points for discussion

In a class discussion at the start, ask whether the road distance will be further than the direct distance. Mention assumptions being made (such as the availability of a city centre heliport). You could also ask students to guess how many times further it is by road.

Make sure that students know how to use a distance table and that they understand the units used (miles or kilometres).

You may need to show students how to calculate the actual distance (in miles or kilometres) from a length measured on the map.

When students have plotted their points, discuss the use of a line of best fit and whether or not it should pass through (0, 0).

At the end of the activity you could use the questions given on the last slide and the student sheets to help learners reflect on their work.

Extensions

Try using a larger scale map to see if it gives a better result.

Research relative times for two modes of transport.

Research relative CO₂ emissions.