

Getting there: The greenest route

Description

This topic deals with the external costs of transport which affect society but which are not paid for by the transport users who cause them. Road, rail, air and water are compared.

Activity 1: Measuring freight

Activity 2: External costs

Activity 3: Which route is best?

The idea of the *tonne-miles* as a measure of freight movement is introduced in **Measuring freight**. Each group needs a copy of the **Measuring freight** cut up sheet or a ready prepared set of laminated cards. The freight cards split into three freight groups – 50, 100 and 200 tonne-miles. Draw out in discussion with the pupils that it is an idealised measure; real transport measurement is complicated by things like time of day, type of load and so on. Creating three new freight cards will help the pupils develop their understanding of how weight and distance are inversely related in the measure.

The second activity introduces the concept of **External costs** – those costs which affect society but which are not paid for by the transport users who cause them. Some of these are green costs. Using the **External costs** information sheet, the pupils decide which costs to include to measure the *green cost of transport*. There is no right or wrong answer but air pollution, climate change, nature and landscape and up/down stream costs could be included as they all affect the climate and the environment.

In many real situations, data is available but needs modifying before it can be applied to specific problems. The external costs are presented as Euro / 1000 tonne-km in the year 2000. The pupils' task is to convert the costs into pounds per tonne-mile for the present day.

They may do this by first working out the green costs for each mode of transport from the table and then converting the five results using a calculator – this is best done in groups so they can share out the work and check each other's calculation. Alternatively, you can provide all the information in a spreadsheet for the pupils to programme the conversions. Whichever method is used, you will need to decide whether to encourage the use of a formula for compound interest or simply to develop a common sense, iterative approach.

Resources

Calculator or a spreadsheet, road atlas and distance chart or access to route planners on the internet.



Building on the first two activities, **Which route is best?** involves an investigation into the greenest method for transporting coal from Greenburn mine in Scotland to Drax power station in Selby, Yorkshire which supplies 7% of UK generated electricity. Typically, rail is used to transport the coal but there have been occasions, including rail strikes, where roads have been used. Although waterways are promoted as a green alternative the infrastructure is not in place in many areas. Some information is provided on the **Which route is best?** information sheet but the pupils will need to find out some things for themselves by using a road map or the internet.

The mathematics

The topic provides an opportunity for work on inverse proportion, conversion calculations, compound percentage change and information handling skills.