

6 Typical Mathematics activities in the Case Studies

The table shows the case studies available at the time of writing, with examples of the mathematical activities involved. More detailed information is given in *Portraits of the Case Studies*.

Alien invasion	Locating spaceships using clues involving distances and directions. Cracking a code to escape from a cell.
Crash test	Controlling variables systematically (e.g. speeds, design of cars, barrier types). Making hypotheses and testing them by observing the effects in crash test experiments. Presenting findings to the class.
Explorers	Planning a route bearing in mind fuel, food reserves and distance. Trading between planets using fantasy units of currency. Using algebraic functions to decide where charges should be placed to destroy asteroids.
Highway link design	Proposing the location of a by-pass, using data tables and graphs used by the Highways Agency. Satisfying constraints (minimum radii of curvature, verge clearance, cambers etc). Costing and presenting proposed solutions.
How risky is life?	Comparing people's perceptions of the causes of death with the actual statistics. Interpreting very large and very small probabilities. Deciding what these say about our behaviour and attitudes. Exploring random variation.
Keeping the pizza hot	Choosing packaging for a pizza. Measuring temperatures as the pizza cools. Using data logging software. Fitting a graphical model to the cooling of a pizza. Calculating longest reasonable travel time before a pizza becomes too cold to eat.
My music	Describing the characteristics of individual genres of music. Using the tempo of music to illustrate the creation of a compound measure, beats per minute.
Mystery tours	Planning a 5-day trip to satisfy constraints of money/time and keep all the tourists happy. Converting currencies, satisfying baggage allowances etc.
Outbreak	Using coordinate clues to locate infected people. Mixing ingredients in correct proportions to create an antidote. Using resources optimally to design a vaccination programme.
PointZero	Solving number, spatial and logic puzzles to progress in an adventure game. Using number sequences to escape from a building. Using rotation and reflection to recreate a given pattern. Using codes and loci to escape from underground tunnels.
Product wars	Designing a questionnaire and conducting market research, Mixing ingredients to obtain optimum nutritional value and taste; designing the packaging for the drink.
Reducing road accidents	Exploring one town's accident database. Controlling variables to decide how a given sum of money should be allocated on safety measures. Preparing a case and presenting it convincingly.
Save a baby kangaroo	Determining the age and species of a 'Joey' from tail and foot measurements and graphs of growth data. Devising an appropriate nutrition regime from tables of nutrient data. Presenting this regime.
Speed cameras	Exploring perceptions of randomness and relating this to the perceived effectiveness of speed cameras. Simulating the effects of different sitings
Water availability	Analysing a complex decision faced by a water aid agency; Devising and using a compound measure (eg per capita) to decide on a 'fair' distribution of resources.
You reckon?	Breaking a problem up into component parts; combining everyday knowledge to create chains of reasoning that result in reasonable estimates of useful quantities.