

Narrative

While the class is visiting the city of Manford, monstrous alien spaceships appear in the sky and drift overhead before slowly landing. The class has been separated into groups to visit various places of interest, so the first aim is to try and join up and escape on the school bus. However, the landing of the ships has caused a lot of panic. Everyone is trying to leave the city, clogging the streets with traffic.

Problem

Where exactly have the Alien ships landed?

Mathematics content objectives

- Estimate and calculate using measures in everyday situations (level 5)
- Use and interpret maps and scale drawings (levels 5 and 6)
- Recognise that all points on the circumference of a circle are the same distance from the centre (level 6)

Learning points

- A map ratio is the ratio of the distance on the map to the actual distance on the ground, in the form of a unitary ratio $1 : n$, without units, e.g. a scale of 1 cm to 50 m is a map ratio of $1 : 5000$, since 50 m is 5000 cm.
- The scale of a map or drawing should always be stated next to the map.
- A distance 'as the crow flies' is the shortest distance between two points, measured as a straight line.
- Points on the circumference of a circle are an equal distance from the centre.
- 8 kilometres is approximately 5 miles.

Alien invasion resources

- 1.1 A4 resource sheet of tourist map marked in squares (print one per pair, preferably in colour, but black and white is acceptable as the colour version is shown on the screen)
- 1.2 Video clip: Globe breaking news – presenter announces the arrival of four large spaceships over Manford City (3 minutes)
- 1.3 Slide: tourist map of the city marked in squares
- 1.4 Optional video clip: amateur video of alien ships overhead, cars blocking streets (2 minutes)
- 1.5 An A4 resource sheet with gaps in the clues to be filled in (print one per pupil)
- 1.6 Audio clip: radio newswatches eyewitness accounts giving clues which allow the positions of the alien ships to be mapped (4 minutes)
- 1.7 Slide: table of equivalent distances in miles and kilometres with the distances as represented on the map
- 1.8 Optional A4 resource sheet with a supplementary problem for groups that finish quickly (print several copies)
- 1.9 Video clip: doors opening on the spaceships (1 minute)
- 1.10 A4 resource sheet of homework task 1 (print one per pupil)

For pupils: rulers, string, calculators and small counters to mark positions on maps.

Main activity

Give out **Resource 1.1**, a tourist map of Manford city, one per pair. Explain that you, a couple of other teachers and your class have arrived in Manford on a school bus. You have split up into groups to visit different places.

Ask the pairs to consider the map's features. Let the discussion get under way, then without explanation play **Resource 1.2**, a 3-minute video clip setting the scene. Four big space ships have loomed overhead and have landed out of sight.

► What are we going to do?

Display **Resource 1.3**, a slide of the tourist map. Elicit the need to get back to the bus and try to escape. *If time allows, play **Resource 1.4**, a 2-minute amateur video of spaceships overhead and cars blocking streets.*

► What information do we need before we make any move?

Establish that the first priority is to determine exactly where the ships have landed. You may need to point out that the map currently has no scale and north is to the right. Check that pupils can use the grid system by asking them for the positions of a few features.

Give out **Resource 1.5**, one per pupil. Explain that these are clues from the latest broadcast from the local radio station but that there are gaps in the information. Get pupils to study the gaps, then draw out from them that most of the missing information is likely to be distances or directions.

Play **Resource 1.6**, an audio clip of eye-witness accounts lasting 4 minutes. Ask the class to listen carefully and to fill in the gaps. Advise them to use abbreviations such as km for kilometres, m for miles, N for north, and on. You may need to play the audio clip a second time. (For the missing information, see the Solutions.)

Leave it to the groups to sort out the information and decide how to use it to locate the spaceships. You may need to remind them that 5 miles is about 8 km.

Differentiation

Some pupils may need help in identifying and using the map scale. If necessary, discuss and complete the table of information on **Resource 1.7**, a slide of distances as represented in centimetres on the map.

*If time allows, pupils could try the supplementary problem on **Resource 1.8**. Introduce this problem by saying that there could possibly be a side gate out of the zoo but, if so, more information about its whereabouts is needed.*

Review

Bring the whole class together to discuss methods and solutions. The scale of the map is 1 cm : 400 m, or 1 : 40 000, and the first three space ships are at G8, L10 and O6. Discuss the three possibilities for the position of the fourth space ship at the vertex of a parallelogram, at D12, T8 and J4. D12 can be ruled out as the first ship, at G8, was the only one to land anywhere south of the Observatory. T8 can be ruled out as it is due north of St Andrew's Cathedral, contradicting one of the clues.



Homework

Play **Resource 1.9**, a 1-minute video clip. The large metallic doors on the alien craft open and in the darkness beyond them strange noises can be heard.

Give out copies of **Resource 1.10**. Task A is essential, as pupils collect data that they will need in the next lesson. As an alternative, cover the work in an extra lesson, as described in the introduction to the unit. To provide a longer or more challenging homework, choose from Task B or Task C.

Advise pupils which problems to answer on the sheet and which in their exercise books. Remind them that their answers in Task B are estimates and should be sensible (e.g. rounded to 1 decimal place). Task A is essential, as pupils collect data that they will need in the next lesson. As an alternative, cover the work in an extra lesson, as described in the introduction to the unit.