

## Y9 Lesson 2 Activities

The first section of this worksheet introduces the idea of modelling the Earth's surface to find the distance between different settlements. The second section demonstrates how weather forecasters can predict temperature changes

### Modelling the Earth's Surface:

- 1) Consider the locations of Exeter and Exmouth in the South West of England. Given that Exeter is 12km north and 5km west of Exmouth.
  - a) Sketch a graph representing these locations, where the origin is 12km south of Exeter and 5km west of Exmouth.
  - b) Find the straight line distance in km between Exeter and Exmouth.
  - c) If it starts raining in Exeter at 11:00 and the rain cloud moves directly towards Exmouth with a speed of 20m/s, find the time it is expected to start raining in Exmouth.
  - d) Using trigonometry, find the bearing of Exeter from Exmouth.
  
- 2) Now consider the locations of Birmingham and Oxford, which are separated by 100km, in Central England. Given that Oxford is on a bearing of  $150^\circ$  from Birmingham and Birmingham is on a bearing of  $300^\circ$  from Oxford:
  - a) Sketch a diagram representing these locations.
  - b) Using this diagram add a point at Cirencester, which is located due south of Birmingham and due west of Oxford.
  - c) Using trigonometry, find the distance of Cirencester from Birmingham and Cirencester from Oxford.

### Predicting the Temperature:

- 3) Suppose that the temperature of the air  $y$  in  $^\circ\text{C}$ , at time  $x$  in hours after sunset, cools according to the equation:  $y = 5 + 20/(x+1)$ 
  - a) Produce a table for the values of  $y$  when  $x = 0, 4, 9, 14, 19$
  - b) Plot these points on a graph with  $x$  ranging between 0 and 20 on the horizontal axis and  $y$  ranging between 25 and 5 on the vertical axis.
  - c) Connect these points with a smooth curve.
  - d) Using this graph predict the temperature at 12 hours after sunset.
  - e) Using this graph predict the time when the temperature is  $10^\circ\text{C}$ .