Stage 3 ★★
Mixed Selection 1

1. **Don't be late**
   Driving to Birmingham airport, Mary drove at 55 miles per hour for the first two hours and then at 70 miles per hour for the remainder of the journey.
   Her average speed for the entire journey was 60 miles per hour.
   How long did Mary's journey to Birmingham Airport take?

2. **Bike shop**
   I walk to the bike shop at 3 miles per hour and cycle back along the same route at 12 miles per hour.
   What is my average speed, in miles per hour, for the time I am travelling?

3. **Decimal clock**
   In the late 18th century, a decimal clock was proposed, in which there were 100 'minutes' in one 'hour' and 10 'hours' in one day.
   Assuming that such a clock started from 0:00 at midnight, what time would it show when an ordinary clock would show 6 am?

4. **Overtake**
   Tom left a motorway service station and travelled towards Glasgow at a steady speed of 60 mph.
   Tim left the same service station 10 minutes after Tom and travelled in the same direction at a steady speed, overtaking Tom after a further 1 hour 40 minutes.
   At what speed did Tim travel?

5. **Very long line**
   If the line on the right were 0.2mm thick, how long would it need to be to cover an area of one square metre?

These problems are adapted from UKMT Mathematical Challenge problems (ukmt.org.uk)