

Teacher Notes

Introduction

Pupils can work on this problem individually or with others.

- They can discuss how to look for numbers that are palindromes and how to calculate speed given mileage and minutes.
- They can discuss how to approach the problem and compare approaches.

This problem deals with a pupil's ability to recognise numbers which are palindromes and calculate speed based on distance and time.

What I know (think)

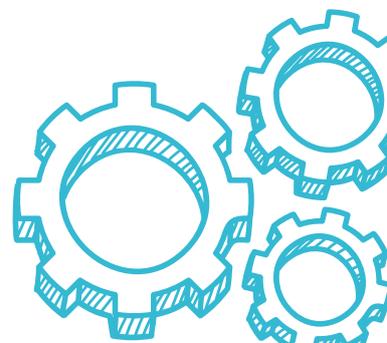
The pupils should know from the given problem:

- Justine and her friends are on a motorway driving to a music concert.
- Justine notices that her odometer displays 8998 miles.
- Justine tells her friends that 8998 is a palindrome as it reads the same forwards as it does backwards.
- After first noticing that the mileage was a palindrome, ten minutes later Justine again notices another palindrome number on her odometer.
- They need to work out how fast Justine's car was travelling during the ten minutes.

What I need to know (identify)

Pupils need to identify:

- what a palindrome is and what the next palindrome number after 8998 is;
- how many miles Justine's car travelled from the first palindrome number to the next palindrome number; and
- what mph means, and how fast the car was travelling from the first palindrome number to the next palindrome number.



Travelling with Numbers 2 (Continued)

What I need to do (employ)

Pupils use the information provided and break the problem into the following steps:

Next palindrome number:

- Pupils should first look at the 9000s, as there can't be any further palindrome numbers in the 8000s.
- 9000 isn't a palindrome, but pupils should recognise that if the first two numbers are nine and zero (90), then writing them backwards will give zero and nine (09).
- Pupils should recognise that putting these numbers together will give 9009, which is a palindrome, and also the first one after 8998.

Distance travelled:

- Pupils should subtract the first palindrome from the second: $9009 - 8998 = 11$
- Pupils should calculate that the car travelled 11 miles.

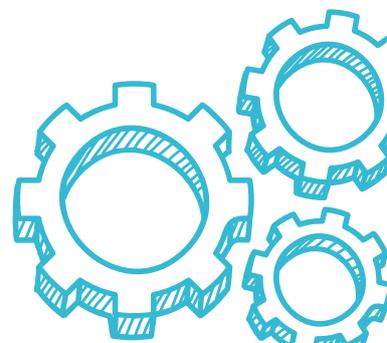
Speed of car:

- If the car travelled 11 miles in 10 minutes, then pupils should work out how much it travelled in one hour to find out how fast in mph it was travelling.
- If pupils multiply 10 minutes by six they will get one hour. Therefore, they should also multiply 11 miles by six to get the speed in mph.

What I did (review)

Pupils will use self-assessment, peer assessment or teacher feedback to decide whether they have approached the problem as intended.

- Did they know what a palindrome is and how to find the next one after 8998?
- Did they work out how many miles the car travelled from one palindrome to the next?
- Did they work out the speed of the car using an appropriate method for turning miles per ten minutes into miles per hour?
- Did they check to see if their answer for the average speed of the car is realistic and appropriate for a motorway?



Travelling with Numbers 2 (Continued)

Curriculum Objectives

This problem should enable pupils to demonstrate their knowledge, understanding and skills through:

Developing pupils as individuals

Demonstrate an ability and willingness to develop logical arguments

- Pupils will use their understanding of palindromes and distance and time to calculate the speed the car was travelling.

Thinking Skills and Personal Capabilities

This problem can provide an opportunity for pupils to demonstrate a variety of the following Thinking Skills and Personal Capabilities:

Managing Information

- Ask focused questions
- Select the most appropriate method for a task

Thinking, Problem-Solving and Decision Making

- Justify methods, opinions and conclusions
- Make connections between learning in different contexts
- Generate possible solutions, try out alternative approaches and evaluate outcomes

Being Creative

- Makes new connections between ideas/information
- Challenge the routine method
- Value the unexpected or surprising

Working with Others

- Listen actively and share opinions
- Suggest ways of improving their approach to working collaboratively

Self-Management

- Seek advice when necessary
- Compare their own approach with others' and in different contexts
- Organise and plan how to go about a task

Cross-Curricular Skills

This problem should enable pupils to demonstrate a variety of the following Cross-Curriculum Skills:



Using Mathematics

