Cross additions

Children find totals of 5 numbers less than 10 to give different totals.

Skills practised:

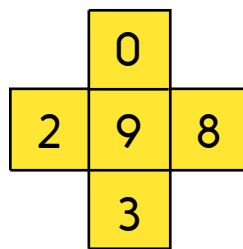- Adding five single-digit numbers using number facts including pairs to 10, to help.

Conjecture: It is possible to find two sets of five numbers less than 10 such that one total is one more than the other. Each number from 0 to 9 must only be used once.
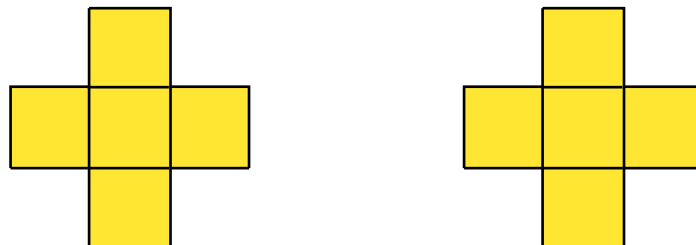
What to do:

Children work individually or in pairs.
You will need sets of 0 to 9 digit cards.

1. Find the total of all five numbers in this cross. Can you see a pair to 10 which will help you to find the total more easily?

```
      ┌───┐
      │ 0 │
  ┌───┼───┼───┐
  │ 2 │ 9 │ 8 │
  └───┼───┼───┘
      │ 3 │
      └───┘
```

2. Use any five digit cards from 0 to 9 to make your own cross and find the total.
   Think about the easiest way to add them.
3. What is the smallest total that you can find? And the biggest total?
4. Now for the real challenge! Use all the digit cards 0 to 9, once each to make two crosses so that one cross has a total which is 1 more than the other.

HINT: When you have made two crosses, look at their totals and think how you might swap numbers between them to make their totals closer together.

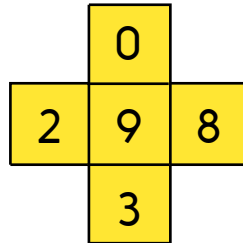Now can you find a different way to make two crosses with one total 1 more than the other?

Aims:

- To use trial and improvement to work towards a solution
- To become more fluent in adding single-digit numbers

Minimum number of calculations expected

10

Cross additions

1. Find the total of all five numbers in this cross. Can you see a pair to 10 which will help you to find the total more easily?

```
    0
2   9   8
    3
```

2. Use any five digit cards from 0 to 9 to make your own cross and find the total. Think about the easiest way to add them.

3. What is the smallest total that you can find? And the biggest total?

4. Now for the real challenge! Use all the digit cards 0 to 9, once each to make two crosses so that one cross has a total which is 1 more than the other.

    Can you find a different way to make two crosses with one total 1 more than the other?