AIMSSEC

AFRICAN INSTITUTE FOR MATHEMATICAL SCIENCES
SCHOOLS ENRICHMENT CENTRE (AIMSSEC)
AIMING HIGH

DIGITS

What is the sum of all the digits in all the integers from one to one million?

Don't do a lot of tedious adding up – think mathematically!

Note: The sum of all the digits in all the integers from one to ten is 46
(not 55 because 10 contributes only 1 to this sum

Hint: Let a million stand alone.

Now introduce zero.

Give every number except one million a **special partner**.

Help

"Think of all the numbers from 0 to 499 999.
Take partners from the numbers from 500 000 to 999 999".

Extension

Try the activity Sandwich Puzzle.
Suppose you have two 1's, two 2's and two 3's.

Arrange these six digits in a list so that:
between the two 1's there is one digit giving 1?1,
between the two 2's there are two digits giving 2??2,
between the two 3's there are three digits giving 3???3.

Can you do the same if you only have 1's and 2's? Explain your answer.
Can you do the same if you include two four's, and between the two 4's there are four digits?
What about two 1s, 2s, 3s, 4s and 5s?

https://aiminghigh.aimssec.ac.za/years-6-to-12-sandwiches/