C6
Josh's Book

The Big Picture

Recommended for year 5

Strategy C – Trial By Improvement
Children should make trials that they gradually improve through mathematical reasoning

NC Objectives

Add and subtract numbers mentally with increasingly large numbers (Addition and Subtraction Year 5)

Stickability

Pupils continue to practise both mental methods and columnar addition and subtraction with increasingly large numbers to aid fluency (addition and subtraction, notes and guidance, year 4)

Perform mental calculations, including with mixed operations and large numbers (operations, year 6)

Key Questions

How many digits are there in 5 pages? 10 pages? 11 pages? 100 pages? 101 pages?

How can we record our work so that we can quickly find a solution as the problem increases in difficulty?

Resources

Copied sheets of problem

Copies of the tables in PitSTOP 4 and 5, extended if needed.

Problem based learning

To find out how many pages Josh has read, you can simply write all of the page numbers out and count the digits. Children will realise this is inefficient. They should use the tables provided to recognise that the number of digits can be grouped for 1, 2 and 3 digit numbers, making the problem more accessible and promoting a systematic strategy.

LEARNING SEQUENCE

HOOK

Ask the children what is the longest book they have read. Ask them how many digits were in the page numbers – they will be unable to answer! Show PitSTOP 6 (original problem) and ask how they would start.

Teacher Led

Show PitSTOP 1 to the children so that they understand how we are calculating the number of digits. Next, show PitSTOP 2 and model using trial by improvement to find the solution. Use 15 pages as a trial and count the digits, modifying afterwards.

Student Led

Show PitSTOP 3 and discuss how Josh has used a short-cut by working systematically. Allow children time to work through PitSTOP 3 and 4 in pairs.

Support: work though PitSTOP 1 and 2 as a group with an adult.
Extension: challenge your partner! You guess the amount of pages for an amount of digits.

Teacher Led

Report back from PitSTOP 4 and show the children PitSTOP 5. Allow time for them to solve how many pages would be between 100 and 200. How many digits would there be after 101 pages? (172)

AFL & Independent

Allow children time to complete PitSTOP 6 independently.

Support: show table from PitSTOP 5 and work as a group to find other page totals.
Extension: PitSTOP 7

PLENARY

Children to explain their solution. Use the visualiser to show children's methods of recording. Celebrate those that showed persistence and used a systematic strategy.