

The Maths — No Problem! Spiral Approach and Variation

The spiral approach allows pupils to learn mathematical concepts well and deeply. The following pages show just one example of the MNP spiral approach in action!

This is an example from the Year 3 textbook, specifically chapter 2 which is looking at the topic of subtraction.

Let's start with lesson 11, which is actually revisiting simple subtraction learnt in Year 2 and here we are using it as the first lesson for Year 3 pupils as an accessible entry point for learning the concept.

Simple Subtracting

Lesson
11

In Focus

Sam had 58 cookies.
He ate 4 cookies.
How many cookies did he have left?

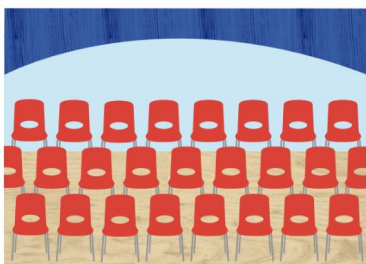


In lesson 11, the anchor task was essentially 58 subtract 4, now in lesson 12 the problem is 658 subtract 4. Although it's a three digit number, we're dealing with just the ones, pupils don't need to subtract from the hundreds or the tens. Also they should be familiar with these numbers from the previous lesson.

Simple Subtracting

Lesson
12

In Focus



There were 658 chairs in the school hall.
Ruby took 4 chairs away.
How many chairs are there now?

Simple Subtracting

Lesson 13

In Focus



There were 658 children at a concert.
40 left the hall during the interval.
How many children remained in the hall?

All these lessons have anchor tasks that utilise a story format, but essentially lesson 13 is calculating 658 subtract 40 . Can you see the spiralling? Can you see the variation? Just one lesson ago pupils would have been subtracting the ones and now they're subtracting the tens and this is all they have to worry about.

Simple Subtracting

Lesson 14

In Focus



There were 658 children at a concert.
500 left the hall at the end of the concert.
How many children remained in the hall?

By lesson 14 pupils are subtracting hundreds, but in this problem they can essentially ignore the tens and the ones, as they have to calculate 658 subtract 500 .

Simple Subtracting

Lesson 15

In Focus

There were 975 beads in a jar.
Emma used 723 beads to make some necklaces.
How many beads were left in the jar?



Here the spiral approach is giving pupils repeated opportunities to revisit the core idea, which is you subtract the ones from the ones, the tens from the tens and the hundreds from the hundreds. Have you noticed though, that we are never repeating the lesson, we are always building on the knowledge learnt previously. This is shown perfectly in lesson 15 which asks the pupils to calculate 975 subtract 723, where they are having to subtract at each place value.

Subtracting with Renaming

Lesson 16

In Focus

1 is smaller than 6.
How can I subtract 6 ones from 1 one?

How can Hannah subtract to find the answer?

$$\begin{array}{r} 831 \\ - 26 \\ \hline \end{array}$$



Then we can move on to lesson 16, this is the first time in this chapter pupils will need to use renaming. As we are potentially introducing the concept of renaming, we want to tackle the simplest form, so we start with the ones.

In a spiral approach we not only vary the mathematics but we also want to vary the situations. The aim is for pupils to learn a range of subtraction situations. Up until this point we have been using the 'before and after' scenarios to illustrate subtraction. Now in lesson 17 we will be using a comparison problem, as well as varying the renaming to the tens rather than the ones.

In lesson 18 the problem is 520 subtract 269, how can you take away 9 ones from 0? We can see that the ones are not enough, neither are the tens, so now pupils are expected to use double-renaming.

Subtracting with Renaming

Lesson 19

In Focus

In a school, there are 300 pupils.
125 of them are boys.
How many girls are there?



Lesson 19 adds more variation by introducing a problem using the part-whole scenario. The whole is the 300 pupils and one of the parts is the known number of boys, the other part is unknown and this is the number of girls. This anchor task also addresses one of the most difficult subtraction problems for young pupils, subtracting from a multiple of a hundred. The difficulty comes when multiple place values are equal to zero.

In summary, each lesson allows ample opportunity for pupils to revisit the core ideas — subtracting ones from ones, tens from tens and hundreds from hundreds, and when there's insufficient ones or tens we can rename. These two core skills are repeated throughout the chapter, even though none of the lessons or anchor tasks are ever duplicated. We want each lesson to contain something new for the pupils to grasp. Plus, each lesson provides variation through situation, as well as mathematics.