Add and subtract within 20 using the split strategy

Level: 1

Curriculum area: Mathematics

Strand/s: Number

Sequence title: Additive thinking

Lesson number: Lesson 2 of 11

Lesson overview

This lesson introduces students to splitting (or partitioning) numbers to help with mental addition and subtraction. This forms the basis for students to learn more complex partitioning strategies.

Victorian Curriculum 2.0 Content Descriptions

- Add and subtract numbers within 20, using physical and virtual materials, part-part-whole knowledge to 10 and a variety of calculation strategies (VC2M1N04)
- Partition one- and two-digit numbers in different ways using physical and virtual materials, including partitioning two-digit numbers into tens and ones (VC2M1N02)

Mathematical vocabulary

- Split
- Number bond
- Ten
- Ones.

For definitions and further information:

- visit the Department of Education's online Numeracy Glossary
- download the VCAA Mathematics Glossary (Word | 3300 KB).

Materials required for the lesson

Student

- Mini whiteboard and marker – 1 per student
- 'Number line 1-20' (Supporting Resource 1) – for enabling prompt only.

Teacher

- Bundling sticks – 1 bundle of ten and 9 loose ones.
- 'Mathematical Observation Record' (MOR) (Key Resource 4).

Learning objective

- We will add and subtract using the split strategy.

Success criteria

- I can split teen numbers into ten and ones.
- I can use the split strategy to add and subtract within 20.
- I can explain my thinking using number bonds and number sentences.

Lesson structure

Lesson stage	Timing	Description of explicit teaching, learning activities and formative assessment
Stage 1	**5 mins**	Activate prior knowledge - Addition and subtraction within 10 **Set** students up with a mini whiteboard and marker. **Write** addition and subtraction problems on the board for students to complete on their mini whiteboards. Examples: 5 + 4 = (9), 2 + 6 = (8), 3 + 4 = (7), 9 – 7 = (2), 8 – 5 = (3), 7 – 6 = (1)
Stage 2	**20 mins**	Introduce split strategy for addition **Explain** that students will learn a strategy for adding a 1-digit number to a teen number called the split strategy. **Write** '12 + 4 = ___' on the board. Using bundling sticks, **represent** 12 as a bundle of 10 and 2 loose ones and 4 as 4 loose ones. **Explain** that when we add to a 2-digit number like 12 we can split it into 10 and ones. **Represent** this by moving the 10 away from the two 1s and drawing two lines from the 12 to make a number bond with 10 and 2 as the parts. **Explain** that the next step is to add the ones. **Represent** this by moving the two 1s and four 1s together and writing the number sentence, 2 + 4 = 6. **Explain** that the next step is to add the 10. **Represent** this by moving the 10 closer to the 1s and writing the number sentence, 6 + 10 = 16. **Write** problems on the board to solve together. **Ask** students to write the problem on their mini whiteboard, split the 2-digit number, add the ones, then add the 10. Examples: 16 + 2 = (18), 14 + 4 = (18), 13 + 2 = (15), 12 + 7 = (19) **Provide** more guidance initially by doing all the steps together.

		Fade guidance by doing fewer steps together, leaving more steps for the students to do independently. **Continue** providing questions with less guidance until confident that most students can complete problems without any prompting or support. **Extend** students by encouraging them to explain their thinking verbally without writing. **Enable** students by encouraging them to continue writing their thinking on their mini whiteboard and provide a copy of 'Number line 1-20' (Supporting Resource 1) to assist with counting on to add.
Stage 3	**20 mins**	Introduce split strategy for subtraction **Explain** that the split strategy can be used for subtraction, too. **Write** '17 - 4 = ___' on the board. Using bundling sticks, **represent** 17 as a bundle of 10 and 7 loose ones. **Explain** that when we start by splitting the 2-digit number into 10 and ones. **Represent** this by moving the 10 away from the 7 ones and drawing 2 lines from the 17 to make a number bond with 10 and 7 as the parts. **Explain** that the next step is to subtract the ones. **Represent** this by removing 4 ones and writing the number sentence, 7 – 4 = 3. **Explain** that the next step is to add the 10. **Represent** this by moving the 10 closer to the ones and writing the number sentence, 3 + 10 = 13. **Write** problems on the board to solve together. **Ask** students to write the problem on their mini whiteboard, split the 2-digit number, subtract the ones, then add the 10. Examples: 15 – 3 = (12), 18 – 7 = (11), 16 – 3 = (13), 17 – 2 = (15) **Provide** more guidance initially by doing all the steps together. **Fade guidance** by doing fewer steps together, leaving more steps for the students to do independently. **Continue** providing questions with less guidance until confident that most students can complete problems without any prompting or support. **Extend** students by encouraging them to explain their thinking verbally without writing. **Enable** students by encouraging them to continue writing their thinking on their mini whiteboard and provide a copy of 'Number line 1-20' (Supporting Resource 1) to assist with counting back to subtract.
Stage 4	**10 mins**	Independent practice – Split strategy for addition and subtraction **Set** students up with their workbook and pencil. **Write** questions on the board for students to complete in their workbook.

		Example addition questions: 15 + 2 = (17), 13 + 6 = (19), 12 + 3 = (15), 11 + 8 = (19) Example subtraction questions: 14 – 1 = (13), 18 – 6 = (12), 19 – 5 = (14), 16 – 4 = (12) **Extend** students by encouraging them to work out the answer mentally before writing down the solution using the split strategy. **Enable** students by encouraging them to write the solution first, then explain verbally. Provide a copy of 'Number line 1-20' (Supporting Resource 1) to assist with counting on and back. While students are working independently, **provide support** where needed and **make relevant observations** using the 'Mathematical Observation Record' (MOR) (Key Resource 4).
Stage 5	**5 mins**	Exit ticket – Split strategy **Write** problems on the board, for example, 11 + 7 = (18) or 16 – 3 = (13), and give students time to think. **Prompt** students to signal when they have the answer by giving a thumbs up. **Signal** students to say the answer at the same time. **Choose** non-volunteers to explain how they know the answer by counting on or counting back.

Teaching considerations

If students are not fluent in addition and subtraction within 10, include fluency activities for students to develop automaticity in those basic addition and subtraction facts prior to this lesson.

After accuracy in using the split strategy has been established, continue reviewing the skill in order for students to develop fluency.