

Rotten plums

Annotation

Emma knows that 10 can be partitioned into 1 and 9 and uses this to solve the problem. She refers to a mental model of 36 on the hundreds board and makes a connection between this and the problem posed. She draws on her knowledge of the addition and subtraction of 10s to subtract using rounding and compensation. Emma correctly applies the term 'subtraction' to this mathematical operation.

Problem: Rotten plums

The teacher shows this problem to the student and reads it with her as required:

Kat has 36 plums and she threw away 9 rotten ones. How many did she have left?

Student response

Emma: Twenty seven.

Teacher: Tell me how you did that.

Emma: 10 less than 36 is 26, so 9 less will be 27.

Teacher: What do you know that helped you?

Emma: I can go up and down in 10s and I know that I have to put one back on because 9 is one less than 10. I took away 1 too many.

Teacher: Tell me why you did it that way.

Emma: Because we've been practicing going up and down in tens on the hundreds board. I can start from any number so subtracting 10 is easy, and 9 is one off 10.

Teacher: How would you record that?

Emma: Well like this because it's subtraction (she writes $36 - 9 = 27$) or like this (she writes $36 - 10 = 26$) and then I add 1 to this so it's then this (she writes $26 + 1 = 27$).

$$36 - 9 = 27$$

$$36 - 10 = 26$$

$$26 + 1 = 27$$

Adding dinosaurs

Annotation

Jo is able to partition a single digit into smaller parts. She makes it clear that her choice of partition is deliberate to achieve a tidy number to work with. Jo uses the term 'tidy number' to describe the decade. Jo illustrates her thinking process with an addition equation although the way she writes it is technically incorrect.

Problem: Adding dinosaurs

The teacher shows this problem to the student and reads it with her as required:

Max had 15 dinosaurs and Alice had 8. How many did they have altogether?

Student response

Jo: Twenty three.

Teacher: Tell me how you did that.

Jo: I added 5 to make 20 and then I added another 3 and that makes 23.

Teacher: What do you know that helped you?

Jo: I know that 8 is made up of a 5 and a 3 and I know 15 and 5 is 20 and that's a tidy number. It makes it easy.

Teacher: How would you record that?

Jo: Well I started at 15, which is Max, I plussed five then plussed three, which makes 23, so like this.



$$15 + 5 = 20 + 3 = 23$$

Parking cars

Annotation

Mari uses her knowledge of doubles to solve this problem, recognizing that this is a more efficient strategy than counting.

Problem: Parking cars

The teacher shows this problem to the student and reads it with them as required:

There are some cars in the car park. Another 8 cars come in and now there are 14 altogether. How many cars were in the park to begin with?

Student response

Mari: Six.

Teacher: Tell me how you did that.

Mari: Well I used my doubles. I know $7 + 7 = 14$ so it's like one up and one down. Because that's 8, which is one up from 7, the answer has to be 6 because that is one down from 7.

Teacher: What do you know that helped you?

Mari: Well I actually know $8 + 8 = 16$ too so I could check it that way. 14 is 2 less than 16 and 2 less than 8 is 6. So it's 6 that way too.

Teacher: Tell me why you did it that way.

Mari: Because doubles are quick. You don't have to count.

Teacher: How would you record that?

Mari: Well I'd just write $6 + 8 = 14$ because it shows that 6 is what we had to start with. And that was what the question was.

$$6 + 8 = 14$$

Scoring points

Annotation

Michael is able to partition numbers into smaller parts to make addition easier and he recognises the convenience of using tidy numbers. He knows that he has to add all the numbers together and that he can change the order of addends without changing the sum (the commutative property). He also recognises that he can apply his knowledge of pairs of numbers that add to 10. He demonstrates his thinking by recording an addition equation, although it is technically incorrect.

Problem: Scoring points

The teacher shows this problem to the student and reads it with him as required:

Our team scored 6 points in the first game, and we scored 15 in the second game. But we scored only 4 in the last game. How many points did we score altogether?

Student response

Michael: It's 25.

Teacher: Tell me how you did that.

Michael: I know that I have to add all of these together. I'll start with 15 and 6. 15 and 5 makes 20. Another 1 is 21. 4 more is 25.

Teacher: What do you know that helped you?

Michael: I know that 6 is 5 and 1. I know that adding to 20 is easy.

Teacher: Tell me why you did it that way.

Michael: Oh... I could have done it just by making 10 from the 6 and 4 and adding that onto the 15. That would have been easier.

Teacher: How would you record that?

Michael: Well I reckon the easiest way is to just write what I just did which was 15 plus 10 more, so kind of like this.

$$15 + 6 + 4 = 10 = 25$$

Money in the bank

Annotation

Josie knows addition facts so she readily partitions 9 into $8 + 1$ and uses her doubles to solve this start unknown problem. She shows the partitioning in her recording of the problem.

Problem: Money in the bank.

The teacher shows this problem to the student and reads it with her as required:

I now have \$17 in my bank account after just banking \$8. How much did I have to start with?

Student response

Josie: Well it's 9. I started with \$9.

Teacher: Tell me how you worked it out.

Josie: I just know that $8 + 8 = 16$ so $8 + 9$ will be 17. I just used my doubles.

Teacher: How would you record that?

Josie: Like this.

$$8 + 8 + 1 = 17$$