Dialogue Box

Naming Division Strategies

After working on division earlier in the year, this Grade 5 class is once again turning its attention to solving division problems in Investigation 3 of this unit. In Session 3.1 they solved the division problem 374 ÷ 12 and made posters showing their solutions. There are three posters on the board. As part of the class discussion, they are organizing and naming their strategies.

Teacher: We have three posters on the board right now. Do you remember way back at the beginning of the year when we named multiplication strategies? We're going to do the same thing with division strategies. Let's look at Terrence's strategy. First he multiplied 20 × 12 and got 240. Next he multiplied 10 × 12 and got 120. He added those and then added one more 12. Can anyone describe in general words what Terrence did? Try to use only words, not numbers.

Tamira: He multiplied until he got close to the total number.

Felix: He added, too.

Teacher: Felix, what do you mean, "he added, too?"

Felix: He added 240 and 120, and then the last 12.

Teacher: So Terrence multiplied the divisor and kept building until he got close to the number of 12s in 374. Does anyone want to suggest a name for this strategy Terrence used?

Tamira: How about "multiplying up"?

There are murmurs of agreement from the class.

Teacher: OK, so we'll call this one "multiplying up." Look at your posters. Who else used a strategy that fits into the multiplying up strategy?

Benito: I think I did, too, but I'm not sure. I did 25 × 12 = 300 and then 6 × 12 = 72.

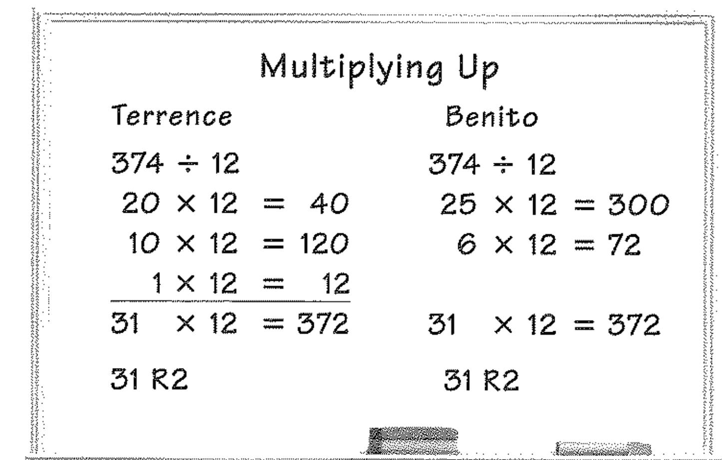
Teacher: Why aren't you sure if you multiplied up?

Benito: I know I multiplied. But Terrence multiplied by 10s, and I used 25. So I'm not sure if it's the same.

Teacher: Oh, interesting. [The teacher writes Terrence's and Benito's solutions on the board.] What does everyone think?

Alicia: I think it's the same because he multiplied. I think you could multiply a lot of different ways, but it's still the same strategy.

Students agree that Benito's solution is also an example of multiplying up.



Teacher: Do we have any other strategies besides multiplying up?

Hana: I think mine is different. I used the division box and did 120 ÷ 12 = 10 and kept subtracting until I couldn't divide by 12 anymore.

Tavon: I'm confused. Even though Hana said she did 120 ÷ 12 = 10, that seems like it's the same thing as 12 × 10 = 120.

Teacher: That's interesting, Tavon. These do seem the same in some ways, but I think we can make it a different strategy. Even though Hana and Terrence both used 10, 12, and 120, Terrence was thinking about multiplying, but Hana was thinking about dividing. [The teacher writes Hana's solution on the board.] Hana broke the dividend into parts. Who has a name for Hana's strategy?

Hana: Can we call it "dividing down"?

The class agrees.

Dividing Down
Hana
$374 \div 12$

$$
\begin{array}{r l}
\underline{\quad 31} \text{ R2} & \\
12\overline{)374} & \\
\underline{-120} & 10 \\
254 & \\
\underline{-120} & 10 \\
134 & \\
\underline{-120} & 10 \\
14 & \\
\underline{-12} & \underline{+\ 1} \\
2 & 31
\end{array}
$$

Teacher: So now we have another strategy. Who else used dividing down?

Several students say that they also used this strategy and show their solutions.

Teacher: Are there any other strategies people used?

Walter: I didn't use it, but I know we've tried to find easier, close problems in other stuff we've done. But I couldn't think of one.

Talisha: I kind of tried to do that, too. I knew that 360 is divisible by 12. It's thirty 12s. That was really close. And I could just add on 12 in my head to get 372, so I already knew that was thirty-one 12s, with 2 left over.

Tamira: Her way is really like multiplying up.

Teacher: Yes, it is. She just started closer to 374 because she knew that 360 equals twelve 30s. It's a good thing to think about whether there's another problem you can easily solve that's really close to the problem you're trying to solve. But you're not always going to be able to use this method.

As the teacher asks students to decide what is the same and what is different about these strategies, she is listening for an understanding of the general approach taken by each student. Do students notice that in several of the methods, students multiplied the divisor until they reached the total, even though they may have multiplied in different ways? Do they notice that the dividend can be broken into smaller numbers?

Naming strategies and keeping them posted provides students with some language to describe their division strategies and raises students' awareness of approaches to consider when they are solving problems.