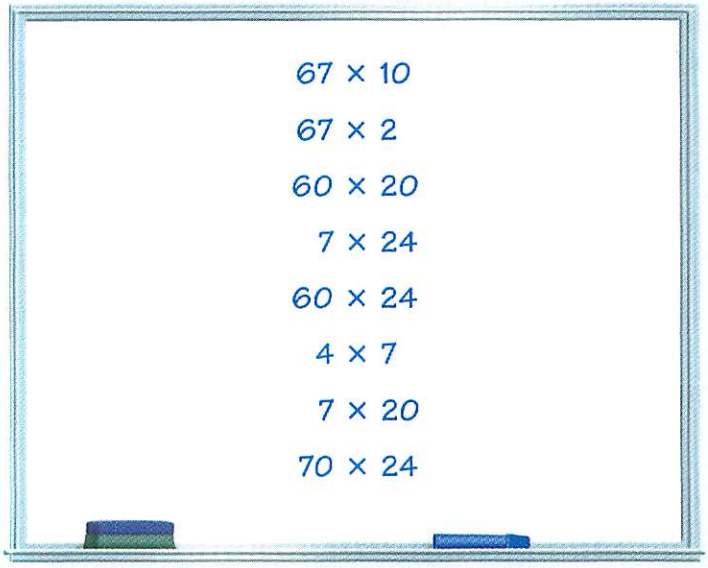
Creating a Cluster Problem

Students have been working on using clusters of related problems to help them solve 2-digit by 2-digit multiplication problems. They are now making cluster problems of their own for the problem 67 × 24. The teacher has collected the following set of problems related to 67 × 24 from various students:



Teacher: All of these problems can help you solve 67 times 24. Who would like to tell us which ones you used?

Terrell: I used 70 × 24. Then, from the answer I got, I took off 3 × 24.

Teacher: How did you find the answer to 70 × 24?

Terrell: I really thought of it as 4 × 25 and then 3 × 25, only it's 40 × 25 and 30 × 25. That's 1,000 plus 750, so take away 70 because it's 24, not 25, and that's 1,680. Then I subtracted 3 × 24.

Teacher: So let's add 70 × 25 to our list because that helped you too.

Ramona: I did 67 × 10 two times and then 67 × 2 two times. 670, 670, 134, 134—add them all up and it's 1,608.

Luke: I used 4 problems: 60 × 20 = 1,200; 7 × 4 = 28; 60 × 4 = 240; and 7 × 20 = 140. The only one that's not up there is 60 × 4. (The teacher adds 60 × 4 to the list.)

Teacher: Let's look at Luke's solution. Where did the 60 in 60 × 20 and 60 × 4 come from?

Jill: From 67. He broke it up into 60 and 7.

Teacher: Then what did he do with those 2 parts of the number?

Enrique: He had to multiply them times both parts of 24—that's 20 and 4. So he ended up with 4 problems to solve.

Teacher: Why does it make sense that there are 4 problems, doing it Luke's way?

Bill: It's like if you had 67 teams with 24 on each team, and first you had to put 20 kids on 60 teams, and then 20 kids on the other 7 teams . . .

Anna: But then you still had to put 4 more kids on each team. Four kids on 60 teams, and four kids on 7 teams. So all the teams have 24 kids!

As the students continue to share their solutions, the teacher points out how different problems in the cluster lead to a variety of ways to solve 67 × 24. This group of students has made use of the following strategies: making an easier problem and compensating for the change [Terrell] and breaking the problem apart into smaller, more manageable problems while keeping track of all the parts of the problem [Ramona and Luke].