

Table Handout #1

Leaves and Caterpillars: The Case of David Crane

Armed with the data that he had collected while he monitored his students' work, David was now ready to make decisions about the discussion. He knew from the outset of the lesson that his students would solve the task using several different strategies, so the real question was in what order should they be presented? As David now indicated in the third column of the chart that he had used in monitoring his students, he decided to start with the concrete and move to the abstract.

Strategy	Who and What	Order
<p>Unit Rate Find the number of leaves eaten by one caterpillar (2.5) and multiply by 12 or add the amount for one 12 times.</p>	<p>Janine's Group – multiplied 12×2.5 (sticks representing caterpillars)</p> <p>Kyra's group – added 2.5 12 times (picture of leaves and caterpillars)</p>	<p>3rd (Janine)</p>
<p>Scale Factor Find that the number of caterpillars (12) is 6 times the original amount (2), so the number of leaves (30) must be 6 times the original amount (5).</p>	<p>Jason's Group – narrative description</p>	<p>4th (Jason)</p>
<p>Scaling Up Increasing the number of leaves and caterpillars by continuing to add 5 to the leaves and 2 to the caterpillars, until you reach the desired number of caterpillars.</p>	<p>Jamal's Group – table with leaves and caterpillars increasing in increments of 2 and 5</p> <p>Martin and Melissa – did sets of leaves and caterpillars</p>	<p>2nd (Jamal)</p> <p>1st (Martin)</p>
<p>Additive Find that the number of caterpillars has increased by 10 ($2+10=12$), so the number of leaves must also increase by 10 ($5+10=15$).</p>	<p>Missy and Kate – since caterpillars increased by 10, then leaves must also increase by 10</p>	
<p>Other Multiplied leaves and caterpillars</p>	<p>Darnell and Marcus – saw the problem as multiplicative, but did not understand the ratio. They saw the problem as 5 leaves per day per caterpillar. Did not see the 2 to 5 ratio in the problem (incorrect answer).</p>	

David decided the best approach would be to start with the least sophisticated representation (a picture) of the least sophisticated strategy (scaling up by collecting sets). Although Martin's group and Melissa's group used similar strategies, he decided to have Martin's group share. He and his partner chose to draw sets of 2 leaves and 5 caterpillars. Although the problem was solved correctly, they did so by counting up and not by multiplying.

David then decided that Jamal's group should share next. Since he was wanting to move from the least sophisticated strategy to the most, the table showed how the leaves and caterpillars increased in increments of 2 and 5. Although it still was not multiplicative, it was the next logical sequence.

Janine's group on the other hand determined that each caterpillar ate $2\frac{1}{2}$ leaves a day. Then they simply multiplied that by 12 to get 30. Since this showed that they understood that the problem was multiplicative, David decided that he would call on them to share next.

Students could be asked to compare Jamal and Janine's responses and to identify where Janine's unit rate (2.5 leaves per caterpillar) is found in Jamal's table (it is the factor by which the number of caterpillars must be multiplied to get the number of leaves).

Finally, David would have Jason's group share their strategy. They had chosen to write about their solution instead of using a diagram or table. This strategy of scale factor was the most sophisticated representation for the class. It showed that they understood that the task was multiplicative and that the two quantities needed to grow at a constant rate.

Students could also be asked to compare Jason's explanation with Jamal and Martin's work to see if the scale factor of 6 can be seen in each of their tabular and pictorial representations.

Once David had decided which groups would present, he needed to figure out which student would speak on behalf of each group. Although he sometimes had both group members make the presentation, this strategy often resulted in one student doing most of the talking and the other receding to the background. He decided to call on the group member who had not had a chance to share their work in the last week. The groups assumed that any member could be asked to present, so every student in the group needed to understand the work that the group had produced well enough to discuss it in front of the class. David found that this assumption on their part also helped him to hold all students accountable for participating in the small-group discussions.