Memorable Moments in Middle School Mathematics

Autumn Leaves

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Featuring Mary Jane DiPippa, Redbank Valley School District

In writing this column and in other professional activities, I have the opportunity to collaborate with secondary mathematics teachers and actually visit their classrooms. Working with practicing teachers has become one of my greatest professional pleasures. Sometimes when I visit the schools, I am given the privilege of teaching a lesson. It is even more exciting for me when I observe teachers using the activity based lessons that they learned when they were my students. The teacher highlighted in this article, Mary Jane DiPippa, is one of my former students.

It was a beautiful fall day in October 2006 when I observed Mrs. DiPippa's seventh grade class at Redbank Valley School District. Her students entered the classroom carrying bags of leaves because their homework was to gather leaves in their yards and bring them to math class for a special activity. (I have saved this activity for this issue because an article about gathering leaves is appropriate for the fall.)
Mrs. DiPippa had warm–up questions on the board for the students to answer that related to bar graphs.

1. Why do we use bar graphs?
2. What are the components of bar graphs?

She used the questions to review the information that the students had just learned about bar graphs. Some of the ideas that the students recalled were: bar graphs are used to make comparisons; multiple bar graphs require a key; and the bars in a multiple bar graph should look different. The questions also helped the students connect their knowledge to their science class in remembering the differences between maple leaves, oak leaves, and other leaves.

After the class completed the questions and discussed them, Mrs. DiPippa formed the class into groups that the students named Putneyville Primes, Distant Dreams, South Side Girls, and Mayport Flowers - each group being named for a section of the Redbank School District. Mrs. DiPippa had sorted the class into groups according to where they live so that students who lived in the same neighborhood were in the same group.

For the homework assignment, each student brought a bag of leaves that they collected from their yards at home. With their groups, students were directed to count and then sort all of their leaves into three categories - maple, oak and other.

While the groups were sorting and counting, Mrs. DiPippa and I distributed the following supplies

to each group: tape, three colors of paper bars, and another sheet of paper with a scale. Each of the paper bars were nine units long. Students next were asked to convert the number of leaves in each category to the correct number of unit bar lengths. Students cut the bars when necessary to represent the total number of leaves for each category of leaves.

The students soon realized that they were going to prepare a bar graph. After the data had been collected and prepared, Mrs. DiPippa discussed the key components for a bar graph: the title, the labels on the axis, choosing the scale, how the data will be represented, and the key which would show the types of leaves.

Each group then created their own bar graph on a sheet of graph paper for the set of leaves that they had gathered. After each group created their group bar graph, Mrs. DiPippa invited one group at a time to the back wall of the classroom where she had prepared a space to construct a huge graph. Each group wrote the name of their group on the x-axis and taped the paper strips that represented the number of leaves in each category above the name of their group. As each group added their name and bars to the graph, a multiple bar graph was created.

After the classroom graph was completed, Mrs. DiPippa asked the class questions about the graph. Students needed to be able to read the triple bar graph in order to answer her questions.

Some of her questions included:

- Why do we use bar graphs?
- What data are we comparing?
- How can you determine what trees are most popular in our area?
- What area has the most number of maple trees?
- What area has the most number of oak trees?
- What area has the most number of other types of trees?
- What is the difference in the number of maple trees compared to the number of oak trees on the graph?
- Are there any areas that have the same number of trees?
- What is the difference in the number of maple trees to the number of oak trees in the Putneyville area? In the Distant area?

The multiple bar graph encouraged student conversations about how the data from the graph was applied to other subject areas such as science, geography, and art. The students enjoyed learning about where their classmates live, how to make the graph, and how to interpret the data. The graph remained in the classroom and reminded students of the components of a multiple bar graph and why one is used.

Now, this fall, when students travel through the different areas of the district, they can decide if the sample of leaves that they collected for math class really represented the types of trees in the areas of the Redbank District. This activity is a small step toward helping students realize the uniqueness of their own community.