Experiential Math in Practice at MILTON

Kindergarten – Design Thinking and Number Sense

Kindergarteners faced the real-life problem of having a pile of unsorted beads in the *Sadnah* (art studio), but not enough containers to sort each unique bead. The students were challenged to find an attribute to use to sort the beads into the containers. Grappling with the problem, the students shared ideas and spent time sorting, discussing, counting, drawing, writing, and learning to solve the problem together. Throughout the project the students displayed collaboration, strong number sense, empathy, and the ability to problem-solve while sorting.

Grade 2 – Multiple Methods for Problem Solving

Second graders were given a problem-based math task that required identifying different strategies for organizing and counting materials in their classroom. As the students considered various ways to count and organize the markers, pencils, books and manipulatives, they quickly realized that counting one-by-one was not an effective way to count large numbers of objects. They naturally turned to skip-counting, counting by fives and tens, and multiplying to inventory and organize the markers, pencils, books, and manipulatives.

Grade 3 – Strategies and Tools

In Grade 3, students worked on puzzling math scenarios and throughout the process, developed tools to organize information and solve problems. See the example of a third grade math puzzle:

- *I put four cents in the machine to feed the ducks. Seven food pellets came out.*
- *Then, I put ten cents in the machine, and thirteen food pellets fell out.*
- *Then, I put some money in the machine and twenty pellets came out.*
- *Then, I put two cents and only five pellets came out.*
- *Then, I put in five cents and the ducks ate the pellets before I could count them.*

How much money did I put in the machine? Explain.
How many food pellets came out of the machine? Explain.

The students grappled with the problem, strategized on ways to solve it, and collaborated with their learning partners by sharing ideas for different ways to organize the information. The students also discussed using an 'In/Out' chart as another tool for organizing information and solving this type of math problem.

Grade 4 – Essential Questions and Statistics

Rather than using data sets from a workbook, filling in worksheets, and coloring in graphs and pie-charts, fourth grade students were presented raw data in various forms, and asked how to best

organize and present the data. The teachers asked the essential question, 'How can the way we organize and present data be used to influence others or make a point?' As the students organized the data, their discussions provided natural entry points for the teachers to discuss the more precise mathematical terms of *mean*, *median*, and *mode*. Throughout this unit, the students developed a deeper understanding of the mathematics involved in organizing data, key ideas related to statistics, and the correct vocabulary to use when discussing the information.

Grade 5 - Documenting Strategies

As fifth graders grappled with a series of problem based tasks, they developed critical thinking skills, strengthened their ability to analyze data, increased their ability to persevere in the face of challenges, and constructed deeper understanding of mathematics.

The students grappled were given various math puzzles and problem based tasks in which there is not a clear path to solving it. They worked with partners, documented their ideas and strategies, and organizing their thinking. One example of a fifth grade math grapple is 'Last Mathematician Standing.'

> **Last Mathematician Standing**
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> Four people are sitting in a row of four chairs, all facing forward.
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> **Objective**: For the last person in the row to be standing while all others are seated.
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> **Rules**: The person in front could stand and sit anytime. Everyone else could only stand or sit when the person right in front of them was standing, but everyone else in front of them was sitting down.