

Math Messenger

Teaching for Understanding

Alpine School District's Balanced Math philosophy gives teachers a vision of what math instruction should be like. It states that students should: 1.) understand mathematics through inquiry-based tasks that are linked to a real world context, 2.) show work using a variety of tools and strategies, and 3.) provide frequent opportunities for mathematical expression through flexible grouping and class discussion.

These learning opportunities are made available to students through a three-part inquiry lesson format. This lesson format poses a problem or a task for children to solve and explore through which they

build a solid understanding of mathematics. NCTM's *Principles and Standards for School Mathematics* states, "Understanding should be a goal for all of the mathematics we teach."

If understanding mathematics is the goal of our instruction, teachers should plan math experiences that give children opportunities to think, explore, and solve problems in ways that make sense to them. "... When children engage in well-chosen problem-based tasks and focus on the solution methods, what results is new understanding of the mathematics embedded in the task." (Van de Walle, John. *Teaching Student Centered Mathematics*, 2006).

A THREE-PART INQUIRY LESSON: THE PARTS

The three-part inquiry lesson consists of a Launch, an Explore, and a Debrief.

The Launch: A whole class introduction of the task and materials; a time when the teacher introduces new ideas and sets expectations, leaving opportunities for discovery and multiple solution strategies.



The Explore: A time when students use the information given in the launch to explore and solve the task.

The Debrief: A class discussion in which students talk about the mathematics learned as they engaged in the task.

Calendar

January STRANDS, 2009

20 - eNLVM grades 2 - 6

8:00 - 10:45 Advanced (Part 2)

12:30 - 3:15 Beginning (Part 1)

27 - 4th Grade: Geometry

8:00 - 10:45

1st Grade: Derived Facts

12:30 - 3:15

28 - 2nd Grade: The Power of Ten

8:00 - 10:45

6th Grade: Fractions

12:30 - 3:15

February 4

Math Specialists Follow-Up

8:00 - 11:00 Upper Grades

12:30 - 3:30 Lower Grades

February 18

New Teacher Training

8:00 - 11:00 Grades 1 - 4

12:30 - 3:30 Grades K, 5 & 6

February STRANDS

9 - Kindergarten: Composing and Decomposing Numbers

8:30 - 11:15

25 - 3rd Grade: Geometry

8:00 - 10:45

5th Grade: Multiplication / Division

12:30 - 3:15

WORTHWHILE MATHEMATICAL TASKS

The heart of a three-part inquiry lesson is a worthwhile mathematical task (WMT). These WMTs are used to introduce important mathematical ideas and to engage and challenge students intellectually. "...tasks may be connected to the real-world experiences of students, or they may arise in contexts that are purely mathematical. Regardless of the context, WMTs should be intriguing, with a level of challenge that invites speculation and hard work" (*NCTM Principles and Standards, 2000*). These tasks should allow students to solve problems in a variety of ways, at multiple levels of understanding, and be rich in mathematics. An excellent source for worthwhile mathematical tasks is the *Investigations in Number, Space and Data Teachers' Edition*.



THE LAUNCH



An inviting launch begins before the day's math lesson - during the teacher's planning time. Here, she would have assessed her students' understanding of the concepts they have been working on and determine what they need next. She would then select a WMT that addresses a state core objective, which will engage the students' thinking. During the launch she will introduce the task in a way that allows for multiple paths to the solutions, encouraging students to think about the problem and solve it in ways that make sense to them. A variety of materials should be made available for use as needed. The teacher would check for understanding and answer clarifying questions before dismissing the students to explore the task. See the attached checklist for elements of an inviting launch.

FROM RESEARCH TO PRACTICE

Kathy Richardson, a math educator and researcher gives these guiding principles that are important considerations for effective math instruction:

1. Children develop an understanding of concepts through experiences with real things rather than symbols.
2. Teachers can support the development of understanding by presenting planned and focused experiences and by interacting with the children as they work.
3. For children to be engaged by a particular mathematical task, they need to be on the edge of their understanding or level of competence.
4. When working independently, children should be allowed to choose from a group of related tasks.
5. The most powerful learning experiences have value in being repeated.

