

## Opening parents' eyes to rich mathematical literature

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Mathematical literature is known by educators to be a powerful learning tool. It involves listeners in problem solving activities; provides models for solutions; and can act as a catalyst for further problem solving situations (Hong, 1999). Quality literature can bridge the gap between everyday language and the language of mathematics, as well as providing opportunities for oral language development. Through the use of a child's own oral language, mathematical understanding is constructed. Moreover, the use of multicultural literature in the mathematics classroom affirms students' cultural identities and celebrates the value of all children's voices (Strutchens, 2002).

Good mathematical literature used appropriately affords opportunities to enhance students' mathematical learning. Whitin (2002) cautions, however, that much of the so-called math literature which is currently being produced is contrived and didactic, leaving little room for children's own engagement, understanding and extension of the concepts presented. Whitin (2002) also warns that even when rich literature is used, there is the danger of failing to uncover its full mathematical potential.

Writers, such as Marilyn Burns, have introduced many educators to the benefits of using children's literature when teaching mathematics (Burns, 1992). Teachers now recognize the value, and many of the pitfalls, associated with using literature to enhance children's mathematical learning. Parents, however, are not necessarily aware of these benefits and limitations. This poster looks at some strategies for opening parents' eyes regarding the appropriateness of using rich mathematical literature to assist their children's mathematical development. By immersing parents in quality literature and the related engaging mathematical activities that can be repeated at home, mathematics education becomes a family value (Coates & Thompson, 1999).

### **The Use of Rich Literature in the Esso Family Math Program**

For the past five years, team members at the Esso Family Math Centre, at The University of Western Ontario, have been building on the earlier successes initiated at Berkeley in the 1980's by creating resources, and training volunteers to work in community settings with at-risk parents and their children. In an effort to promote positive attitudes towards mathematics, and to increase parents' self-efficacy regarding their ability to facilitate their children's mathematical development, a series of six Family Math sessions are offered to families. The goal is to help parents understand why mathematics is taught the way it is and to demonstrate how they can help their children to learn mathematical concepts through enjoyable activities that they can easily put into practice at home. Carefully selected, high quality children's literature, which is rich in mathematics, is incorporated into each session. The Esso Family Math program provides parents with

optimal opportunities for effectively using stories to extend the learning of mathematics. Some of the strategies used are:

❖ *Choosing Mathematically Rich Literature*

As noted by Whitin (2002) not all mathematical literature supports sound learning. The Esso Family Math Team screened books to meet standards that would ensure opportunities for learning meaningful mathematics. The criteria included:

- an engaging story – more than just counting books
- language that encourages mathematical understanding
- open ended rich problem contexts
- a springboard that enables families to explore, to conjecture, and to reason logically
- mathematics woven into appropriate illustrations
- multiple levels of mathematical thinking that address a range of age, developmental levels, and learning styles.

❖ *Setting the Tone with Literature*

Books which provide mathematical and problem solving opportunities are made available at the beginning of each Family Math session. As families gather and wait for the session to begin, they take a few minutes to read a book, and discuss it. Leaders occasionally enter the discussion to help focus or extend the mathematical language and thinking. The opportunity to explore mathematical literature together as a family sets a positive tone for discussing, listening and learning throughout the session.

❖ *Modelling with Literature*

Depending on the age level, stories are incorporated into the program between one and three times in a session. Esso Family Math volunteers model good reading, questioning and discussion practices that parents can repeat at home. Parents learn the value of listening to their children and asking questions that extend their child's thinking. The focus is on uncovering the math while enjoying the story.

❖ *Creating Links to Other Activities*

The story is almost always extended. It may lead to the creation and discussion of further mathematical problems and/or it may lead to a related hands-on activity. The story may also appear and be presented as a song. Many of the stories refer to events and settings that are familiar to families, thus helping to connect mathematics to their everyday world. Several multicultural titles have been included to highlight the importance of mathematics for all cultures, and emphasize the mathematical accomplishments of all communities. The combination of stories, illustrations, discussions, and follow-up activities or songs serves to support a variety of learning styles thereby heightening the effectiveness of the learning situation. The opportunity to piggyback mathematical

thinking onto the already existing routine of a bedtime story means that families can listen, talk and enjoy mathematics in a positive and stress free environment.

❖ *Talking to Parents about the Math Connections*

Each Esso Family Math session ends with a 10 to 15 minutes *Parent Talk*. The children stay with some of the Esso Family Math volunteers to read a new story and enjoy a snack, while parents gather with the Team Leader who has a firm understanding of mathematics and how children learn. During these parent discussions, the math in every story is uncovered so that the content and concepts are clarified. After a few sessions, parents gradually become more confident and adept in identifying the mathematics in stories without prompting by the Team Leader. Visually, parents gain an understanding of the breadth of the mathematics, the qualities that make stories mathematically rich, and the components of the mathematics curriculum used in their child’s school when the discussion is transferred to a chart such as the one below:

**Where’s the Math?**

Strands → Stories ↓	Number Sense & Numeration	Measurement	Geometry and Spatial Sense	Patterning and Algebra	Data Management & Probability
Everybody Needs a Rock	✓	✓	✓		✓
Counting on Frank	✓	✓		✓	✓

❖ *Beyond the Program*

Recognizing that families need to repeat the mathematical learning situations after they leave the Esso Family Math sessions, several strategies have been incorporated to support families in finding rich math literature. Parents are given a list of the books used each week as well as suggestions for other appropriate titles. In some sessions only part of a book is read. This strategy is used to encourage families to seek out the book in their local library in order to finish it. Local libraries are contacted and provided with a list of all the books used in the program so that they can have them on hand for families. The program has been well supported by the local librarians, and in some cases library staff have visited Esso Family Math sites to share other books and offer free membership applications for the library. Some libraries have even hosted and organized the six-week program.

## **Discussion**

Quality literature is one of the tools that the Esso Family Math Centre has used to build the understanding and interest for mathematics that empowers parents to help their children succeed. As one parent commented:

*I have learned that math is everywhere. Math can be fun. It has a wider context than I realized – it's not just numbers. I never thought that patterns had anything to do with math. I think we overlook simple ideas in our daily lives that can be used to implement different math concepts. We can sing songs with math ideas and read math-related books. This program is a wonderful start to mathematics.*

This poster session will offer educators an opportunity to view and discuss the strategies used by the Esso Family Math Centre to open parents' eyes to rich mathematical literature.

## **Examples of Children's Literature used in the Esso Family Math Program**

Baylor, B. (1985). *Everybody Needs a Rock*. New York: Aladdin Paperbacks.

Clement, R. (1991). *Counting on Frank*. Milwaukee, WI: Gareth Stevens.

Dale, P. (2001). *Ten in the Bed*. Cambridge, MA: Candlewick Press.

Grifalconi, A. (1986). *Village of Round and Square Houses*. New York: Little, Brown & Company.

Inkpen, M. (1989). *Blue Balloon*. New York: Little Brown and Company.

Keats, E. (1971) *Over in the Meadow*. New York: Puffin Books.

Murphy, S. (1996). *A Pair of Socks*. New York: HarperCollins Children's Books.

Rosen, M. & Oxenbury, H. (1989). *We're Going on a Bear Hunt*. New York: Simon and Schuster.

Walsh, E. (1991). *Mouse Count*. Singapore: Harcourt Brace & Company.

## References

- Burns, M. (1992) *Math and literature (K-3)*. White Plains, NY: Math Solutions Publications.
- Coates, G. & Thompson, V. (1999) Involving parents of four- and five-year olds in their children's mathematics education. In J. Copley (ed.), *Mathematics in the early years* (pp 205-214). Reston, VA: The National Council of Teachers of Mathematics.
- Hong, H. (1999) Using storybooks to help young children make sense of mathematics. In J. Copley (ed.), *Mathematics in the early years* (pp 205-214). Reston, VA: The National Council of Teachers of Mathematics.
- Strutchens, M. (2002) Multicultural literature as a context for problem solving: children parents learning together. *Teaching Children Mathematics* 8(9), 448-454.
- Whitin, D. (2002) The potentials and pitfalls of integrating literature into the mathematics program. *Teaching Children Mathematics*, 8(9), 503 –504.