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Using Literature to Build First Grade Math Concepts

Gwyn E. Lightsey

In the last decade, many elementary teachers have advocated a holistic approach to education. Teachers use thematic units to incorporate reading and writing into all areas of the curriculum. However, teachers have often continued to teach mathematics in isolation. Traditionally, the math program consisted of instruction in finding answers to textbook math problems and memorizing addition, subtraction, multiplication, and division facts. Except for learning to count money or tell time, math seemed to have little application for children in daily life. The majority of the math curriculum was made up of skills, but the language for understanding mathematics was neglected. One way to integrate mathematics into other curriculum areas and help learners become "active constructors of mathematical knowledge is through literature" (Whitin and Wilde, 1992). In an effort to enhance my first grade math program, I searched for authentic ways to incorporate literature. In this paper, I will share what I have learned.

Categories of books

According to Gailey (1993), children's books appropriate for teaching mathematics may be divided into four categories. First, counting books which "reinforce number concepts and can be used to teach addition, subtraction, and in some instances multiplication and division (Gailey, 1993). Second, number books, which reinforce a particular number. Two

examples Gailey uses are Jane Moncure's *My Six Book* (1986), and Jeffrey Moss' *Five People in My Family* (1983). Third, storybooks, which may be used to introduce or reinforce mathematical concepts. Fairy tales, folk tales, or any other stories in which the author touches on a mathematics concept can be used. For instance, Gailey (1993), used Dr. Seuss', *The 500 Hats of Bartholomew Cubbins* (1938), to reinforce the concept of large numbers, addition, and subtraction. Finally, concept or informational books like David Schwartz's *If You Made a Million* (1989), are useful in exploring specific mathematical concepts.

Counting books

Since I was working with first graders, I used numerous counting books to review the numerals from 1 to 10 and lay the foundation for addition and subtraction. One of my favorites is *Moja Means One: Swahili Counting Book* by Marjorie Feelings (1971). This book uses African people in native dress to illustrate the numerals from one to ten and also teaches children the Swahili word for each numeral. After I shared this book, I asked several children to stand up in front of the group and we counted boys, girls, children with tennis shoes, children wearing blue, and so on. The students were not only counting, but were also classifying sets of objects. Next, I paired children up, gave them spinners and unifix cubes, and asked one child to spin for a number and the other child to show that number with the unifix cubes.

Another wonderful book I shared was *Anno's Counting Book* (1975). In this book, Anno has made beautiful, detailed illustrations of seasonal landscapes. Each page contains numerous objects that represent a particular numeral. For instance, on page five, children might find five cows, five houses, five trees, and so on. My students loved this book and read it often. After using this book, I asked students to

pick a number and make their own picture similar to what Anno had done in his book. Pat Hutchins (1982), book, *One Hunter* is also suitable. In this book each page contains several African animals who are hiding from a big game hunter. The pages are numbered consecutively using numerals from one to ten. Children especially like searching for the missing animals. After reading this book, my students made their own counting books using a variety of subjects like animals, cars, and toys.

Number books

Although Gailey (1993), recommends number books, I introduced my children to several songs and rhymes to aide their understanding of specific numbers. For example, I played the song, "This Old Man" (Hoffer, et al., 1993) and asked children to act it out. Next, I took out a flannel board and let children come up and make up sets of objects representing different numerals. I also introduced addition and subtraction with the flannel pieces and asked the children to record the problems we made up in their math journals. In addition, finger plays like "Five Little Ducks," "Five Brown Teddies," and "Ten in a Bed" (Hoffer, et al., 1993) are excellent.

Storybooks

One storybook my students really enjoyed was *Two Ways to Count to Ten* by Dee (1988), which may be used to introduce alternative counting methods. In the story, King Leopard is looking for an heir to his throne. He holds a spear throwing contest. The first animal who is able to throw his spear into the air and count to ten before it hits the ground will become his heir. After many attempts, an antelope wins by counting by even numbers. My children also came up with other counting methods such as counting by fives.

Another folk tale that I used was *The Enormous Turnip* (Hoffer, et al., 1993). In this story an old man and his family find a gigantic turnip in the ground and try to pull it out. First the old man tries, then the old man and his wife try, and then the old man, his wife, and his son and so on until all the characters in the story are needed to pull the turnip out. After sharing this story, I divided students into small groups and gave each student a card with a character's name on it. I played a tape of the story and asked students to act it out. Next, we talked about how the story begins with one character and with each attempt to pull up the turnip a new character is added. With this story, my students were learning about adding one more to a set. In this lesson I incorporated literature, music, drama, and math.

Concept books

According to Gailey (1993), concept books have interesting formats and convey excitement in exploring mathematical ideas. One book that I used to teach the concept of large numbers was Schwartz's, *How Much Is a Million?* (1985). I had been working on place value with my students when I introduced this book to them. It stimulated a nice discussion and children were able to share their experiences with large numbers.

Another concept book that works well with primary children is Eric Carle's, *The Grouchy Ladybug* (1977). I used this book when I was teaching time to my students. My children enjoyed the story so much that we began a mini-unit on ladybugs. The children also dramatized the story and made a big book. *Eating Fractions* by Bruce McMillan (1991), another excellent book, is useful when introducing the concept of fractions. This book has photographs of real children manipulating food to show different fractions. Since the text is simple, emergent readers enjoy reading this book again and

again. After reading the story, I encouraged my students to make their own fractions and eat them.

Benefits and cautions

One benefit I found when using literature in mathematics was the affect on reading. While reading performance and attitude toward reading were not measured, observations of my students leads me to believe that using literature in mathematics enhanced reading. My children were often found in corners and under tables reading books on a range of topics. Their attitude toward reading was wonderful!

The National Council of Teachers of Mathematics (1989), is recommending great changes in the way mathematics is taught. Inclusion of literature is one change that enables a more authentic approach to math. Mathematics can be easily integrated into all aspects of the curriculum (Whitin and Wilde, 1992). It is everywhere in our daily lives, and we need to draw children's attention to it. "Mathematics and language skills develop together as students listen, read, write, and talk about mathematical ideas" (Gaily, 1993). Literature can also relieve "math anxiety" (Whitin and Wilde, 1992, p. 9). Most children and even adults enjoy listening to stories. This is a very nonthreatening experience. With literature, a teacher is able to convey a mathematical concept in an easy, relaxed manner and follow the story with a discussion. Children learn about math without being aware of it. They are not asked to master algorithms in isolation.

According to Eisner (cited in Whitin and Wilde, 1992, p. 14), scientists and mathematicians are artists; like painters and sculptors, they are involved in the process of form making. All things that are made have form, whether they are paintings and music or taxonomies, theories, frameworks, and conceptual systems. When they are well made, they possess

aesthetic properties. Children's literature adds an aesthetic dimension to mathematical learning (Whitin and Wilde, 1992). Numerous children's books, poems, and rhymes may be used to teach mathematics. Children enjoy being read to or sung to and they love rhythm. Children's books not only enhance mathematics, but also reinforce reading and writing (Gailey, 1993). Through literature, the teacher can establish the authenticity of mathematics events. Math is part of everyday life; therefore its understanding is one key to functioning in the world. This literature link enhances motivation and opens students eyes to their lives. In addition, the stories provide models for students to compose stories of their own related to mathematical events.

A caution for teachers is not to impose mathematics on a piece of literature. When using literature to teach a concept, "mathematics should flow from and be a natural part of the book" (Griffith and Clyne, 1991). Educators also need to be aware of the developmental levels of students. He or she should provide some open-ended activities that invite children to make their own investigations and decisions (Griffith and Clyne, 1991). In a child-centered classroom this happens naturally.

Last, teachers need to establish a classroom that promotes literacy and invites communication in all areas of the curriculum (Kliman, 1993). Since many children come to school without rich literacy experiences, teachers must carefully construct print rich environments that nurture budding literacy and at the same time build on rich foundations some children have established (Taylor, 1986). One way to make mathematics important and part of a rich literacy environment is to create a special mathematics book corner where children may read and/or listen to stories that enhance mathematics (Gailey, 1993). In the spirit of integration, many of

these books might be used with flannel stories, listening centers, or with extension activities like roll stories, murals, mobiles, art projects, chalk talks, and dioramas. Connections between mathematics and literature are limitless. Let your imagination guide you.

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