Children begin to develop mathematical thinking long before they enter school. This acquisition occurs in a very natural way as children interact with the environment and their caregivers. Everyday experiences often lend themselves directly to learning mathematics. Planning meals, taking a bath, reading together, playing, and experiencing daily excursions are just a few examples of the daily opportunities children have to count, recognize shapes and numbers, and play with volume and measurement. Nurturing children’s natural curiosity about, and aptitude in, mathematics at an early age is of utmost importance. A little encouragement can go a long way. Lozano and Medearis (1997) point out that young children’s early experiences should be hands-on and meaningful.

Teachers are in the advantageous position of having a close link to the home, and they are a respected part of the learning community. They can work with families to help foster a natural approach to early mathematical thinking and learning. This connection can be accomplished in several ways: family math nights, home links or homework, parent-teacher conferences, teacher-written newsletters, informal discussions with parents, and teacher-led parent education classes. These vehicles are all very powerful ways for teachers to reach out to families and support mathematical learning in the home.

As an elementary school teacher in an urban system, I found that parents often wanted to help their children at home but were not sure how to begin. The following sections provide an ABC primer of ideas that you can offer families to help young children build a mathematical foundation that will help them in the elementary school years and beyond. As a former classroom teacher, I suggested these kinds of ideas to the parents of the children in my classroom. Now, as a teacher educator and a mathematics methods instructor, I have found that these suggestions are applicable to the preservice teachers I work with, especially when they communicate with parents of the students in their practice-teaching classrooms.

Art
Many natural connections arise between art and mathematics. Geometric shapes and lines are ever-present in the environment and in works of art. Parents can point out such shapes and lines and encourage children to incorporate these elements into their drawings and paintings at home, or can play games with children and challenge them to find examples of different shapes in their environment. Armstead (1996) asserted that early learning in the arts, including the visual arts, is linked with improved mathematics learning in elementary school. She described a preschool program that incorporated all the visual and performing arts into its curriculum and discussed how this exposure helped children construct basic mathematical knowledge.

Gluing foam or paper shapes onto paper is fun for children and helps them learn about two-dimensional shapes. Parents can ask their children to name the various shapes as they are choosing them. Precut foam shapes are readily available at local craft stores. Looking for patterns can also be incorporated into art projects (Reitzes and Teitelman 1995). Children
love to string beads of various shapes and colors to make necklaces. Parents can encourage children to create patterns with the beads.

**Baking, Cooking, and Eating**

Having children participate in baking and cooking at home is an excellent way to help them develop measurement skills. Many recipes are “child friendly” and can be done as a family (Reitzes and Teitelman 1995). Children can help measure out the ingredients for a recipe, and in so doing, they learn about the standard measurements used when baking and cooking. Children age 2 and up can help in all parts of the process: planning ingredients, creating a grocery list, doing the shopping, and cleaning up. Children can also begin to learn about fractions and quantities when cooking (Fromboluti, Magarity, and Rinck 1999). Baking and cooking activities are enjoyable for parents and children alike. A few sources for free child-friendly recipes are the Pillsbury Baking Company, www.pillsburybaking.com/everyday/timeWithKidsMore.aspx; The Vegetarian Kitchen, www.vegkitchen.com/kids.html; Kraft Foods, www.kraftfoods.com/kf/ff/kids; and Betty Crocker, www.bettycrocker.com.

Meal or snack time is a great time for children to develop mathematical concepts, such as fractions, multiplication, and division. Snack-sharing scenarios and the concept of fair shares can be understood by very young children (Roberts 2003). The following task works well with my own children, who range in age from 3 to 7. I give the children a small bowl of cookies, for example, and ask them how they can fairly share the cookies among themselves. Children are diligent in making sure that each child gets exactly the same amount of snack.

**Bath Time**

Bath time is a great everyday activity that allows infants, toddlers, and preschool children to explore mathematics concepts through the properties of water (Hansen 1999). Children can play with inexpensive materials, such as empty shampoo bottles, plastic cups, and measuring cups. They learn about measurement and volume through direct interaction with the concrete materials. Bath play allows children to develop a foundation for mathematics over time.

**Blocks**

Playing with blocks is a universal activity that helps build a foundation in all academic areas, including social skills, reading, and science (Hansen 1999). It also helps children develop concepts of geometry, measurement, number, height, area, and volume (Clements and Sarama 2002). Fröbel, the founder of kindergarten, used geometric solids, such as spheres and cubes, to help children learn about basic arithmetic and geometry (Clements and Sarama 2002). Block building also helps children develop spatial sense (Casey and Bobb 2003). Children can count blocks and put them into containers of various sizes. Children also experiment with symmetry, balance, weight, and equivalence of length when building block structures (Curcio and Schwartz 1997). They learn about basic shapes and three-dimensional objects when playing with blocks. Casey and Bobb (2003) discussed the powerful connection between block building in preschool children and later mathematical success in middle and high school. They described how children develop numerous mathematical skills when working with blocks. Parents can provide children with block-play experiences and can gently encourage them to build more elaborate structures and experiment with various ways to play with blocks.

**Chores**

Having children do chores around the house and keep track of them on a chart helps build number and graphing skills (Kliman 1999). Children can use tally marks to keep track each day when they brush their teeth, make their bed, clean their room, and so on.

Feeding a pet can also help children develop number sense and measurement skills (Kliman 1999) as they measure out the correct amount of food or keep track of the number of treats or walks that the animal gets per day. My son counts out the number of crickets that his leopard gecko eats each day and keeps track of the feedings on a monthly chart. Children can also record the growth of a pet.

**Counting and Number**

Parents can help children develop number concepts before they enter school by highlighting everyday situations that require addition or subtraction. According to Baroody and Benson (2001), preschool children have more mathematical competence than was previously thought. Children between the age of 18 months and 3 1/2 years are learning about the basic ideas of number. Parents
can count out snacks to their infants and toddlers. I remember my mother-in-law diligently counting out cereal loops to my infant niece. I was a brand-new teacher, and that occasion was the first time I realized the power of what parents (and grandparents) can do at home with their children.

Parents can help their children learn mathematics concepts by pointing out, and capitalizing on, numbers that they come across in the environment. Children will learn to recognize numbers, for example, when they are asked to press the correct button on the elevator panel. My youngest son learned to count to ten by the number of scoops of water used to rinse his hair during a bath.

Games
Games facilitate positive interaction between parents and children and help them develop number sense. Children are motivated to count correctly by playing board and other games. Games also allow children to practice concepts repeatedly because they enjoy playing the same games many times.

Many preschool games help develop mathematics skills. Hi-Ho Cherry-O is one of my three-year-old’s favorite games. This game helps children develop their counting skills. Sorry! is a great game for kindergarten children because they must count the spaces as they move their pawns. Variations of Bingo that involve numbers are also excellent for developing early mathematics skills. My son learned to recognize the numbers 11–20 by playing Number Bingo.

Mathematics “Toys” and Manipulatives
Some of the most entertaining and educational “toys” that my children have played with at home are mathematics manipulatives purchased from a local teachers’ store. Pattern blocks, wooden beads, bear counters, and unit cubes are great examples of manipulatives that children of all ages can use for explorations. Other places where educational mathematics toys can be obtained are local discount stores or hardware stores. For instance, you can pick up an assortment of keys, knobs, or other cast-off materials that can be used for mathematics learning. Families can also develop their own collections of buttons, rocks, and seashells. Inexpensive mathematics manipulatives such as these can easily be used at home. Young children should be given many opportunities to freely explore these materials. Preschool and kindergarten children naturally gravitate toward making patterns from these items. Parents can also use these items to help children develop counting skills, such as one-to-one correspondence and set making.

Money
Playing with pretend money is fun for preschool and kindergarten children. They love to work with coins. Play shopping is one way for families to role-play with their children and encourage mathematics skills at the same time (Segal 1998). One day in the summer, my three children and I created a “candy store.” We used an old muffin tin as the “cash register” for the various play coins. We had an assortment of small candies, such as gummy worms and miniature candy bars. We assigned prices to each one, ranging from one penny to ten cents. The children had fun over and over again buying items, adding up the prices, and paying for their purchases. They loved playing “customer” and “sales clerk.” They even roped their “Papa” into being a customer. They had fun at the end of the activity eating a few of the treats.

Nature
So many patterns abound in nature that children can discover them while enjoying the outdoors. Exam-
ples include patterns in the number of leaves on a branch, patterns on snail shells, and patterns in the number of petals on a flower. Other mathematics concepts, such as symmetry, are evident in the flora and fauna around us. Parents can point out the beauty and organization in nature when taking their children on walks around the neighborhood, outings to a local park or duck pond, and trips to museums and zoos. Children can collect leaves, rocks, and other items and study them more at home (Hansen 1999).

Puzzles
Jigsaw puzzles are superior for helping preschool and kindergarten children develop spatial ability. They must look at the sizes and shapes of puzzle pieces and how the pieces must be oriented to complete the puzzle. Puzzles help children learn to solve problems, in this instance, putting something back together (Segal 1998). Puzzles that are purposely designed to develop number sense, for example, those having numbered pieces or pieces with pictures of various numbers of objects, serve a double purpose in mathematics.

Sand
When young children play with sand, they develop such mathematical concepts as capacity, weight, and volume. Infants, toddlers, preschoolers, and kindergartners all enjoy scooping, pouring, and feeling sand at the beach, park, or sandbox. Inexpensive beach toys, including shovels, small buckets, sieves, and molds, as well as containers and kitchen measuring cups, are excellent for exploring the properties of sand (Hansen 1999).

Sharing Books
Reading books with children can also be mathematical experiences (Ginsburg and Seo 2000). Children often spontaneously count the objects in the illustrations of a book. Many fictional children’s books have good story elements that focus on subject areas, such as mathematics. Reading books is a good way to reinforce basic concepts, such as counting and number, in an entertaining fashion. Numerous counting books are available for both home and classroom use. Our favorites are Caps for Sale by Esphyr Slobodkina (1987), and Dr. Seuss’s One Fish Two Fish Red Fish Blue Fish (1960) and Ten Apples Up on Top! (1961). Online resources are also available to help teachers find excellent suggestions for connecting literature with mathematics learning. The U.S. Department of Education Web site at www.ed.gov has a section called the Helping Your Child Series that offers free publications for parents. Helping Your Child Learn Mathematics is one booklet in the series that parents and teachers can download and print. Since the booklet is in the public domain, permission to reproduce it for educational purposes has been granted. It is available in English and Spanish and offers entertaining mathematics activities for parents to do at home with their children in preschool through fifth grade. This booklet includes an excellent book list with suggestions for preschool-grade 2 and grades 3–5.

The NCTM online catalog also has excellent resources for families, including A Family’s Guide: Fostering Your Child’s Success in School Mathematics (Mirra 2004). This guide offers ideas for families to do mathematics at home with their prekindergarten through high school children. Teachers can use this guide when preparing parent-teacher events and family math nights.

The best resource is, of course, the local public library. The children’s area of the library often has a special section of mathematics-related children’s literature. I have found a wealth of wonderful titles, including Anno’s Counting House, by Mitsumasa Anno (1982); The Greedy Triangle, by Marilyn Burns (1995); and Ed Emberley’s Picture Pie: A Circle Drawing Book (Emberley 1984). One of the assignments for my preservice teachers in their mathematics methods course is to go to the local public library and find excellent children’s books that help teach mathematics concepts.

Singing
Singing songs can help children learn basic mathematics concepts, such as counting, in a very natural way. Armistead (1996) described the relationship between music and mathematics and how this relationship helps develop logico-mathematical knowledge in very young children. Music helps form connections in the brain that later help children solve mathematics problems (Dodge and Heroman 1999). Many songs involve numbers (Reitzes and Teitelman 1995). Examples include “The Ants Go Marching”; “One, Two, Buckle My Shoe”; “Six Little Ducks”; and “Five Little Monkeys.” Counting is fun when parents and children are singing together.

Technology
Children seem to have a natural affinity for computer games and software, demonstrating that they
can learn basics at an earlier age than seemed possible in the not-so-distant past. Computer games that involve mathematics are intriguing and educational for young children. Parents and teachers can find many types of early mathematics programs, including ones that emphasize counting, money, puzzles, and logic (Segal 1998). Amazingly, very young children, even as toddlers and preschoolers, become competent in using the computer. Families who do not have a computer at home can visit their local library, as many libraries have computers in the children’s section.

**Water Play**

Water play and exploration with a wide variety of materials is a developmentally appropriate way to learn important concepts, regardless of a child’s age, gender, culture, language, or physical and mental abilities (Crosser 1994). It is an ideal way to promote children’s intellectual, social, and emotional development. Doing water play outdoors helps alleviate a mess. The materials involved do not have to be expensive, and many can be found around the house. Some examples of good water toys include plastic cups, funnels, straws, sieves, measuring cups, measuring spoons, sponges, and plastic spoons. Children enjoy filling, spilling, stirring, mixing, and measuring water (Hansen 1999).

**Concluding Thoughts**

Teachers have a unique opportunity to help families interact with their children and discover mathematical concepts. Teachers can suggest to parents ways to play with their children that highlight mathematical concepts, such as number, measurement, and geometry. These early mathematical experiences help lay the groundwork for learning in the elementary school years. Even more important are the quality time spent together as a family and the love of mathematics that is engendered at an early age.

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