CLASSROOM CONNECTIONS

Picture Books + Math = Fun

by Sheri McDonald and Sally Rasch

Preschool through elementary school

Bringing math to life is a challenge for educators. Math-oriented picture books have a place in math education because they often verbalize the concepts that students have difficulty understanding and show these concepts visually. Picture books about math also demonstrate practical uses for math skills in daily life. Educators are often looking for ways to integrate math into their literature-based lessons, and picture books with math concepts offer an excellent way to include math in other curriculum areas.

As with all picture books, math concept books may be categorized in many ways. Some picture books have math concepts hidden within the story, such as Hutchins' *The Doorbell Rang*, while others are written with particular math concepts in mind, such as Leedy's *Subtraction Action*.

Some authors have made a career of writing series books that explain math concepts. Among these math series are Stuart Murphy's MathStart books and Greg Tang's picture books. (See the "Math Masters" sidebar on p.11 for more information.) Other math picture books develop the ideas behind real-life math, such as Demi's *One Grain of Rice*.

The picture books below can be used to enhance math and literature-based thematic units and increase student awareness and knowledge of mathematical applications. Making literary connections with math will improve math skills and lessen student frustration with a subject that is often isolated in the curriculum.

Addition and Subtraction

Duke, Kate. *One Guinea Pig Is Not Enough*. 1998. 48p. Puffin, paper, $5.99 (0-14-056814-X).

Preschool–Gr. 2. One lonely guinea pig is joined by others, one by one, and, together, they create an exciting day full of activities. In each illustration, the guinea pigs climb on large numerals as they enjoy their fun and games. Guinea pigs demonstrate subtraction, as well, by debarking from a sinking boat one by one, in Duke's *Twenty Is Too Many* (Dutton, 2000).

Giganti, Paul, Jr. *Each Orange Had 8 Slices*. Illus. by Donald Crews. 1992. 32p. Greenwillow, $15.99 (0-688-10428-2); HarperTrophy, paper, $5.99 (0-688-13985-X).

Preschool–Gr. 3. Vibrant illustrations in this counting book provide visual cues to assist the reader in finding answers to simple math word problems. While reading, ask students to make pencil drawings of each illustration to use as a tool in counting.

Leedy, Loreen. *Subtraction Action*. 2000. 32p. Holiday, $17.95 (0-8234-1454-X); paper, $6.95 (0-8234-1764-6).

Gr. 1–3. As Miss Prime's students happily participate

Joan Holub's riddles and Regan Dunnick's illustrations make numbers approachable, even funny, in *Riddle-iculous Math*.

in their school's math fair, they are introduced to mathematical concepts involving subtraction skills. The cartoon illustrations and dialogue balloons in each chapter provide readers with the information needed to solve problems. Also see Leedy's *Mission Addition* (Holiday, 1997).

Long, Lynette. *Domino Addition.* 1996. 32p. Charlesbridge, paper, $6.95 (0-88106-877-2).

K–Gr. 3. This simple book begins by using dominoes to introduce combinations for the numbers 1 through 12. Addition facts are then illustrated with appropriate number sentences. In the classroom, use a box of real dominoes to create number sentences, or extend the lesson by forming number sentences with more than two addends. Mary Lankford's book *Dominoes around the World* (HarperCollins, 1998) features additional domino activities and games.

Merriam, Eve. *12 Ways to Get to 11*. Illus. by Bernie Karlin. 1993. 40p. Simon & Schuster/Aladdin, paper, $6.95 (0-689-80892-5).

Preschool–Gr. 2. Clever illustrations and simple sentences describing common situations demonstrate the 12 number combinations that add up to 11. While reading, ask students to write each number sentence. Broaden the lesson by asking students to write additional number sentences that identify the combinations of numbers that, when added together, equal a larger number, such as "13 ways to get to 12."

Multiplication and Division

Anno, Masaichiro, and Mitsumasa Anno. *Anno's Mysterious Multiplying Jar*. Illus. by Mitsumasa Anno. 1983. 42p. Philomel, $19.99 (0-399-20951-4); Puffin, paper, $8.99 (0-698-11753-0).

Gr. 3–6. The Annos use a fantastical multiplying jar with a magical island inside it to help readers visualize the challenging concept of factorials. Lesson extensions are found at the end of the book.

Hutchins, Pat. *The Doorbell Rang*. 1986. 24p. Greenwillow, $15.99 (0-688-05252-5); HarperTrophy, paper, $5.99 (0-688-09234-9).

Preschool–Gr. 3. When their mother makes a batch of chocolate chip cookies, Victoria and Sam divide them. As the doorbell continues to ring, the cookies are divided among more and more children. Practice division skills by asking the class to find ways to divide a batch of cookies equally. Further challenge students by changing the number of cookies or people.

Neuschwander, Cindy, and Marilyn Burns. *Amanda Bean's Amazing Dream: A Mathematical Story*. Illus. by Liza Woodruff. 1998. 40p. Scholastic, $16.95 (0-590-30012-1).

Gr. 2–4. Amanda counts everything she sees until she has a dream that multiplying can help her count even faster. At the end of the book, suggestions for activities to practice multiplication skills are provided.

Pinczes, Elinor J. *A Remainder of One*. Illus. by Bonnie MacKain. 1995. 32p. Houghton, $16 (0-395-69455-8); paper, $5.95 (0-618-25077-8).

K–Gr. 3. The Queen orders Joe to have parading bugs march in equal rows, but Joe can't come up with an arrangement that doesn't leave him out. Using plastic bugs, ask students to assemble each formation in the book. For another buggy math story, see Pinczes' *One Hundred Hungry Ants* (Houghton, 1993).

Fractions

Adler, David. *Fraction Fun*. Illus. by Nancy Tobin. 1996. 32p. Holiday, $16.95 (0-8234-1259-8); paper, $6.95 (0-8234-1341-1).

Gr. 2–4. This brightly illustrated book helps explain the basic concept of fractions and includes examples that can be adapted to hands-on activities in the classroom. For a photo-essay on food items and fractions, see Bruce McMillan's *Eating Fractions* (Scholastic, 1991).

Leedy, Loreen. *Fraction Action*. 1994. 32p. Holiday, $17.95 (0-8234-1109-5); paper, $6.95 (0-8234-1244-X).

Gr. 2–4. The students in Miss Prime's classroom study fractions found in the world around them. In the classroom, use this picture book in parts by introducing each chapter as that fraction concept appears in the curriculum.

Pallotta, Jerry. *Apple Fractions*. Illus. by Rob Bolster. 2001. 32p. Scholastic/Cartwheel, paper, $5.99 (0-439-24173-1).

Gr. 2–4. This straightforward exploration of simple fractions showcases all sorts of apples with appealing illustrations. Pallotta's math books featuring Hershey's chocolate, Twizzlers, and Reese's Pieces are also effective, but be aware of school district food restrictions before using these selections in a classroom setting.

Geometry

Adler, David A. *Shape Up! Fun with Triangles and Other Polygons*. Illus. by Nancy Tobin. 1998. 32p. Holiday, $16.95 (0-8234-1346-2); paper, $6.95 (0-8234-1638-0).

K–Gr. 3. Students can snack on their props after using this colorful introduction to polygons, which suggests the use of cheese slices, pretzels, and bread to teach about shapes.

Emberley, Ed. *The Wing on a Flea: A Book about Shapes*. 2001. 32p. Little, Brown, $15.95 (0-316-23487-7).

Preschool–Gr. 2. On a black background, bold geometric illustrations of objects help the young reader visualize shapes. Go on a walk around the school or playground and ask students to list the shapes they observe. Also see Ifeoma Onyefulu's photo-essay *A Triangle for Adaora* (Dutton, 2000), a shape hunt set in an African village.

Math Masters

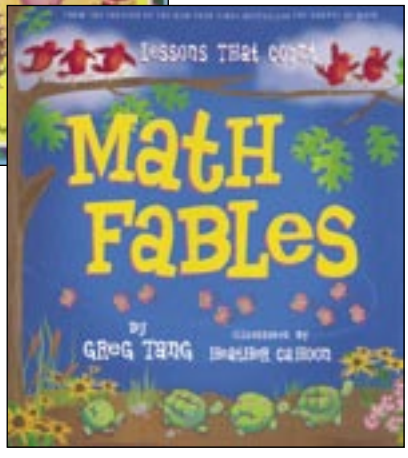
Some authors are so dedicated to explaining math concepts that they've written a multitude of math-oriented titles. Below are some of the most versatile math picture-book authors and information about their series.

- **Axelrod, Amy. *Fun with Math*. Illus. by Sharon McGinley-Nally. Simon & Schuster. Individual books, 40p., $13.95–$15; paper, $5.95–$6.99.**

K–Gr. 3. The Pig family helps students learn math concepts such as geometry, measurement, and probability in these books marked by bright, lively illustrations. Titles include *Pigs on the Ball: Fun with Math and Sports, Pigs Go to the Market: Fun with Math and Shopping, Pigs on the Move: Fun with Math and Travel,* and *Pigs at Odds: Fun with Math and Games.*

- **Marilyn Burns Brainy Day Books. Scholastic. Individual books, 40p., $15.95–$16.95.**

K–Gr. 5. These books cover a variety of topics, including shapes, area and perimeter, addition, place value, and counting. Titles include *The King's Commissioners* and *A Cloak for the Dreamer,* both by Aileen Friedman, and *The Greedy Triangle* and *Spaghetti and Meatballs for All,* both by Marilyn Burns.



- **Murphy, Stuart. MathStart. HarperCollins. Individual books, 32–40p., $15.95–$15.99; HarperTrophy, paper, $4.99.**

Preschool–Gr. 3. Murphy employs realistic dialogue, authentic emotions, and genuine humor in these stories that show math as part of daily life. Books are divided into three age levels, and a variety of topics, such as measurement, time, graphs, and operations, are clearly presented, with related activities featured in the back of each book. The 50-plus titles include *Bug Dance, Game Time!, Elevator Magic, Lemonade for Sale,* and *Divide and Ride.*

- **Tang, Greg. *Mind-Stretching Math Riddles* and others. Scholastic. Individual books, 32–40p., $16.95; paper, $5.99.**

Preschool–Gr. 4. Tang uses jaunty rhymes and engaging objects, from ice-cream cones to ladybugs to famous works of art, to help young readers learn to add and multiply by grouping items rather than counting them individually. Tang's playful, brightly illustrated titles include *Math Fables, The Grapes of Math, The Best of Times, Math for All Seasons, Math Appeal,* and *Math-terpieces.*

Greene, Rhonda Gowler. *When a Line Bends . . . a Shape Begins.* Illus. by James Kaczman. 1997. 32p. Houghton, $16 (0-395-78606-1).

K–Gr. 3. The rhyming text of this story explains how basic shapes are made with simple lines. Descriptions of each geometric shape are laid out to form the shape discussed. Connect math with language arts by asking students to choose a shape and write a description of a real-world object that shares that shape. Publish the geometric descriptions in a class book.

Tompert, Ann. *Grandfather Tang's Story: A Tale Told with Tangrams.* Illus. by Robert Andrew Parker. 1990. 32p. Dragonfly, paper, $6.99 (0-517-88558-1).

K–Gr. 3. Grandfather Tang and Little Soo share a tangram story of the fox fairies Chou and Wu Ling. Grandfather Tang uses tangrams, ancient Chinese shape puzzles, to show how the fox fairies try to outdo each other. Have students create their own set of tangrams to manipulate after sharing this story.

Measurement

Adler, David A. *How Tall, How Short, How Faraway?* Illus. by Nancy Tobin. 1999. 32p. Holiday, $15.95 (0-8234-1375-6); paper, $6.95 (0-8234-1732-1).

K–Gr. 3. This graphically dynamic picture book introduces measurement, including how measuring systems developed in ancient Egypt and Rome; how measurements became standardized; the origin of the metric system; and methods of measuring length, height, and distance.

Leedy, Loreen. *Measuring Penny.* 1998. 32p. Holt, $16.95 (0-8050-5360-3); paper, $6.95 (0-8050-6572-5).

K–Gr. 3. Lisa's dog Penny is her inspiration when she begins to learn about measurement. Also see Rod Clement's *Counting on Frank* (Gareth Stevens, 1991), in which a boy uses his dog as a unit of measurement.

Pinczes, Elinor J. *Inchworm and a Half.* Illus. by Randall Enos. 2001. 32p. Houghton, $15 (0-395-82849-X); paper, $5.95 (0-618-31101-7).

Preschool–Gr. 2. Worms in a

garden work together to measure the vegetables that grow there. When an inchworm is unable to measure an object, a shorter worm comes to help. Use this story to introduce the ruler and the segments that make up an inch. Have students practice measuring everyday objects and compare their measurements with one another. Also see Leo Lionni's classic picture book *Inch by Inch* (HarperCollins, 1960).

Schwartz, David M. *Millions to Measure*. Illus. by Steven Kellogg. 2003. 40p. HarperCollins, $16.99 (0-688-12916-1).

Gr. 1–4. Marvelosissimo the Mathematical Mathematician, also the star of Schwartz and Kellogg's *How Much Is a Million?*, below, explains the history of measurement, and includes basic information about linear, weight, and volume measurements. A presentation on the metric system is included. After sharing this title, have students translate familiar measurements into metric terms.

Tabor, Nancy María Grande. *El gusto del mercado Mexicano/A Taste of the Mexican Market*. 1996. 32p. Charlesbridge, paper, $7.95 (0-88106-820-9).

Preschool–Gr. 4. A trip to a Mexican market for produce illustrates methods of weighing, counting, and making comparisons. Bring this book to life by creating a food market in the classroom, and supply various fruits and vegetables for students to weigh and compare. For an introduction to the numbers one through eight in Spanish, see Susan Middleton Elya's *Eight Animals on the Town* (Putnam, 2000), which follows another shopping expedition.

Number Concepts

Beil, Karen Magnuson. *Mooove Over! A Book about Counting by Twos*. Illus. by Paul Meisel. 2004. 32p. Holiday, $16.95 (0-8234-1736-0).

Preschool–Gr. 1. Countingtown's trolley driver is used to counting his passengers two by two, but when an ornery cow climbs aboard and displaces everyone, he loses track. Activities to help teach counting by twos are included in the back of the book.

McKissack, Patricia C. *A Million Fish . . . More or Less*. Illus. by Dena Schutzer. 1991. 32p. Dragonfly, paper, $6.99 (0-679-88086-0).

K–Gr. 4. Papa Daddy and Elder Abbajon tell Hugh Thomas tall tales about fishing on the Bayou Clapateaux. The tales include large numbers, weights, word problems, and counting. Place value can also be studied with this story.

Packard, Edward. *Big Numbers and Pictures That Show Just How Big They Are*. Illus. by Salvatore Murdocca. 2000. 32p. Millbrook, $22.40 (0-7613-1570-5).

Gr. 1–6. Using humorous illustrations of peas, this book counts by tens from one to one quadrillion. After writing down their own big numbers, have students pair up and try to read each other's number. For the converse, see Packard and Murdocca's *Little Numbers and Pictures That Show Just How Little They Are* (Millbrook, 2001).

Ray, Mary Lyn. *Pumpkins: A Story for a Field*. Illus. by Barry Root. 1992. 32p. Harcourt/Gulliver, $16 (0-15-252252-2); Voyager, paper, $6 (0-15-201358-X).

Gr. 2–4. A man grows pumpkins to try to raise enough money to save a beautiful field from being sold to developers. Many numbers found in the text represent reasonable and unreasonable numbers. After reading, discuss the reasonableness of the numbers in the text, as well as how unreasonable numbers could be made reasonable.

Reid, Margarette S. *The Button Box*. Illus. by Sarah Chamberlain. 1990. 24p. Dutton, $14.99 (0-525-44590-0); Puffin, paper, $5.99 (0-14-055495-5).

Preschool–Gr. 1. While examining the buttons in Grandma's box, a child sorts, counts, and compares the buttons. Ask students to practice various patterning techniques, such as ABAB, AABAA, and so on, using buttons. For more on patterns, see Trudy Harris' *Pattern Fish* (Millbrook, 2000) and *Pattern Bugs* (Millbrook, 2001).

Schwartz, David M. *How Much Is a Million?* Illus. by Steven Kellogg. 1985. 40p. HarperCollins, $16.99 (0-688-04049-7); HarperTrophy, paper, $6.99 (0-688-09933-5).

K–Gr. 3. Schwartz and Kellogg demonstrate the sheer size of million, billion, and trillion in the first, second, third, and fourth dimensions. For an exploration of even larger numbers, as well as the concept of exponents, see Schwartz's *On Beyond a Million: An Amazing Math Journey* (Doubleday, 1999).

Turner, Priscilla. *Among the Odds and Evens: A Tale of Adventure*. Illus. by Whitney Turner. 1999. 32p. Farrar, $16 (0-374-30343-6).

K–Gr. 5. Two letters, *X* and *Y*, crash land in the Kingdom of Wontoo, where the residents, who are numbers, live in two groups—the predictable evens and the eccentric odds. *X* and *Y* try to change the habits of the numbers, but learn that their customs are unique and necessary.

Advanced Math

Demi. *One Grain of Rice*. 1997. 40p. Scholastic, $19.95 (0-590-93998-X).

Gr. 3–6. When a selfish raja promises to reward Rani for a good deed, the clever young girl asks for one grain of rice, with the amount to be doubled each day for 30 days. Children will be as surprised as the raja to see how quickly Rani's rice accumulates. For a humorous take on the concept of doubling for younger readers, see *Minnie's Diner* by Dayle Ann Dodds (Candlewick, 2004), which features a family of brothers, each twice as big and hungry as the one before.

Ellis, Julie. *What's Your Angle, Pythagoras?* Illus. by Phyllis Hornung. 2004. 32p. Charlesbridge, $16.95 (1-57091-197-5); paper, $6.95 (1-57091-150-9).

Gr. 4–7. As young Pythagoras learns about temple architecture and shipping routes in ancient Greece, he discovers how to accurately measure the sides of a right triangle. This handsomely illustrated explanation of the Pythagorean Theorem will resonate most with readers who are already aware of the equation.

Listed below are articles from past issues of *Book Links* that relate to math. For information on how to obtain back issues, see p.3.

- **"Math: More than Numbers," November 1991, p.32**
- **"MathStart in the Making" by Stuart J. Murphy, July 1996, p.25**
- **"Summertime Math," July 1998, p.45**
- **"Counting above and beyond 1, 2, 3," November 1999, p.12**
- **"Exploring Math with Literature," May 2000, p.58**
- **"Taking the Worry out of Math" by Greg Tang, October/November 2002, p.44**

Nagda, Ann Whitehead, and Cindy Bickel. *Polar Bear Math: Learning about Fractions from Klondike and Snow*. 2004. 32p. Holt, $16.95 (0-8050-7076-1).

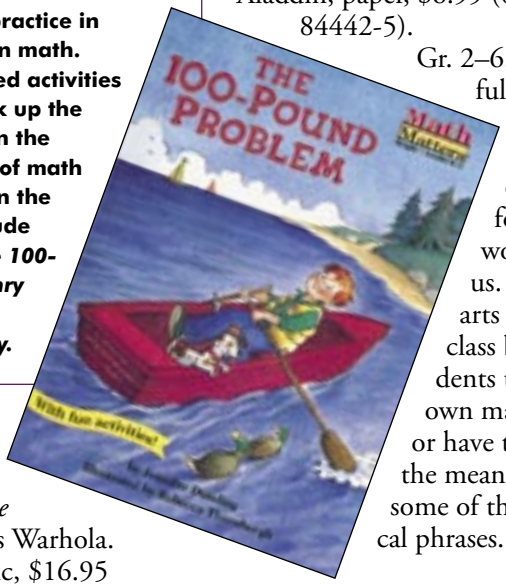
Gr. 3–5. Color photos of two polar bear cubs at the Denver Zoo are accompanied by mathematical expressions of fractions in graphs, charts, and formulas, which demonstrate aspects of the bears' care. Also see Nagda's *Tiger Math* (Holt, 2000), which explores graphs through the story of an orphaned tiger.

Neuschwander, Cindy. *Sir Cumference and the First Round Table: A Math Adventure*. Illus. by Wayne Geehan. 1997. 32p. Charlesbridge, $16.95 (1-57091-160-6); paper, $6.95 (1-57091-152-5).

Gr. 3–6. Students already familiar with shape principles will get the most out of this punny medieval story in which Sir Cumference, his wife Lady Di of Ameter, and their son Radius try to help King Arthur create the perfect table for his knights. Other Sir Cumference titles deal with angles, the number Pi, and three-dimensional shapes.

Series Connection

- **Math Matters. Kane. Individual books, 32p., paper, $4.95. Preschool–Gr. 3. These cheerfully illustrated titles offer children in primary grades practice in reading as well as in math. Charts and suggested activities are included to back up the information found in the text. A wide variety of math topics are covered in the 30 titles, which include *Math Fair Blues, The 100-Pound Problem, Henry Keeps Score,* and *Deena's Lucky Penny.***



Schwartz, David M. *If You Hopped Like a Frog*. Illus. by James Warhola. 1999. 32p. Scholastic, $16.95 (0-590-09857-8).

Gr. 3–8. With an engaging presentation that will also appeal to early-elementary students, Schwartz and Warhola dramatize ideas of ratio and proportion using images from the animal kingdom: "If you were as strong as an ANT . . . you could lift a car!" Detailed factual explanations of each ratio are included at the back of the book. Have students work in groups to write their own "if" phrases and support them with mathematical solutions that prove the validity of the ratio.

Poetry and More

Franco, Betsy. *Mathematickles! Fun Poems to Tickle Your Funnybone.* Illus. by Steven Salerno. 2003. 40p. Simon & Schuster/Margaret K. McElderry, $17.95 (0-689-84357-7).

Gr. 2–4. This book offers brief poems using forms suggested by mathematical equations, for example, "feet - shoes + grass = barefoot." Using this colorful book as a springboard, challenge students to write their own "mathematickles."

Marvelous Math: A Book of Poems. Edited by Lee Bennett Hopkins. Illus. by Karen Barbour. 1997. 32p. Simon & Schuster, $17 (0-689-80658-2); Aladdin, paper, $6.99 (0-689-84442-5).

Gr. 2–6. This delightful collection of poems about math points out how it is found in the world around us. Link language arts with math class by asking students to write their own math poems, or have them research the meanings behind some of the mathematical phrases.

Schwartz, David M. *G Is for Googol: A Math Alphabet Book*. Illus. by Marissa Moss. 2000. 56p. Tricycle, $15.95 (1-883672-58-9).

Gr. 3–5. Entries include *abacus*, *binary*, *cubit*, and so on, up to *y-axis* and *zillion*. Schwartz explains the sometimes-esoteric terms in ways middle-grade children will understand. See how many other math terms students can come up with for each letter of the alphabet.

Problem Solving and Riddles

Helakoski, Leslie. *The Smushy Bus*. Illus. by Salvatore Murdocca. 2002. 32p. Millbrook, $15.95 (0-7613-1917-4).

K–Gr. 3. Mr. Mathers has to find a way to stuff 76 students into a small school bus. This humorous book offers great opportunities for problem solving discussions. Bring the story to life by creating a tiny space in the classroom and encouraging students to find room for a defined number of objects.

Holub, Joan. *Riddle-iculous Math*. Illus. by Regan Dunnick. 2003. 32p. Albert Whitman, $14.95 (0-8075-4996-7).

Gr. 2–5. With verbal puns, rhymes, and Dunnick's wild cartoons, the puzzles and riddles in this book cover everything from metric food fights to pizza fractions and more. Answers accompany each word-and-picture scenario.

Jenkins, Emily. *Five Creatures*. Illus. by Tomek Bogacki. 2001. 32p. Farrar, $16 (0-374-32341-0).

K–Gr. 3. A narrator describes the similarities and differences among five creatures—three people and two cats—who share a home, encouraging readers to use deductive reasoning to determine who can open cupboards and climb trees, among other things.

Lewis, J. Patrick. *Arithme-Tickle: An Even Number of Odd Riddle-Rhymes*. Illus. by Frank Remkiewicz. 2002. 32p. Harcourt, $16 (0-15-216418-9).

Gr. 1–5. Eighteen humorously illustrated rhyming word problems inspire young solvers to practice math strategies. Some riddles may contain a clue or phrase that needs to be defined in order to solve the problem.

Scieszka, Jon. *Math Curse*. Illus. by Lane Smith. 1995. 40p. Viking, $16.99 (0-670-86194-4).

Gr. 2–up. When it's proven that the world is made up of math problems, a student's math anxiety turns into a curse, as a single school day becomes one continuous math problem. Continue the story by asking students to write a sequel. Scieszka and Smith's own sequel, *Science Verse* (Viking, 2004), is now available.

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