

Math and Science Bibliography

Articles

Benson, Tammy R. and Jan E. Downing. "Rejuvenate Math and Science—Revisit Children's Literature." *Dimensions of Early Childhood* (27) 2 (Spring 1999): 9-15.

Offers ideas for integrating preschool math and science activities with children's literature.

Corneille, Birgitta. "Recognizing the Mathematics." *Teaching Children Mathematics* (4) 2 (October 1997): 112.

Discusses mathematical concepts that can be illustrated to children at play and in classroom instruction. Suggested concepts include counting, sorting, geometry, measurement, and patterning. Stresses the importance of following up activities with discussion to reinforce what was learned.

Graham, Theresa A., Cindy Nash and Kim Paul. "Young Children's Exposure to Mathematics: the Child Care Context." *Early Childhood Education Journal* 25 (Fall 1997): 31-38.

Describes a study of preschools to gauge the impact that they have on children's understanding of mathematics. Involved observations of four teachers from two preschools. Took into account physical classroom environments, teaching styles, age grouping and student-teacher ratios.

Greenberg, P. "How and Why to Teach All Aspects of Preschool and Kindergarten Math Naturally, Democratically, and Effectively, Part 1." *Young Children*, 48(4) 1993: 75-84.

Stresses the importance of integrating math into everyday classroom activities. Discusses the use of counting books, physical props and play activities.

Greenberg, P. "Ideas That Work with Young Children. How and Why to Teach All Aspects of Preschool and Kindergarten Math Naturally, Democratically, and Effectively, Part 2." *Young Children*, 49 (2) 1994: 12-18, 88.

Offers ideas to teach children to add, subtract, compare, count and sort. Emphasizes the importance of incorporating math activities into play time.

Hong, H. "Effects of Mathematics Learning Through Children's Literature on Math Achievement and Dispositional Outcomes." *Early Childhood Research Quarterly* (11) 4 (1996): 477-494.

One group of students, which was given math-related stories, as compared to a second group of students who were given conventional stories. Students were observed to gauge the effectiveness of using children's literature to foster mathematics instruction.

Jacobson, Willard J. and Karen K. Lind. "Progress in Science Education." *Science Teacher*, 59 (3) 1992: 38-40.

Reviews progress that has been made in science education. Suggests improving curriculum, enhancing program evaluation, increasing funding and equipment purchases, and involving policy-makers, to enhance science education.

Kallery, Maria. "Making the Most of Questions and Ideas in the Early Years." *Primary Science Review* 61 (Jan./Feb. 2000): 18-19.

Suggests appropriate responses to science-related questions posed by children aged 4-6.

Meriwether, L. "Math at the Snack Table." *Young Children* 52 (5) 1997: 69-73.

Illustrates how snack time can serve as the setting for teaching children math concepts such as counting, measuring, patterns and, fractions.

Morrison, Kathy L. "Science by Discovery." *Texas Child Care* (19) 2 (Fall 1995): p22-26.

Offers ideas and guidelines for incorporating science into daily classroom activities. A unit on insects is provided as an example.

Patton, M. M. & T. M. Kokoski. "How Good is Your Early Childhood Science, Mathematics, and Technology Program? Strategies for Extending Your Curriculum." *Young Children* 51(5) 1997: 38-44.

Suggests criteria to use in evaluating science and mathematics curriculum. Curriculum design, learning environment and parental involvement are among the factors the authors believe should be incorporated into the evaluation of math and science curriculum.

Sharpe, Pamela J. "Thinking About Thinking: A Study of the Adult's Role in Providing for the Development of Number Awareness in Children." *Early Child Development & Care* 144 (1998): 79-89.

Focuses on children's mathematical knowledge at the transition from preschool to primary school. Teachers and principals were surveyed to determine what they understand about children's math skills and how appropriate materials and lessons are for addressing the issue of how children approach math problems.

Whitin, D.J. "Literature and Mathematics in Preschool and Primary: The Right Connection." *Young Children* 49 (2) 1994: 4-11.

Offers suggestions for how books dealing with birthdays, lunch time and the calendar can supplement preschool mathematics instruction.

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Books and Reports

Bowman, Barbara T. *Math, Science, and Technology in Early Childhood Education*. Paper presented at the Forum on Early Childhood Science, Mathematics, and Technology Education, 1998.

This paper discusses seven math preschool curriculum areas. Each chapter provides background material, activity ideas and a list of material requirements. The appropriate level of development and techniques for monitoring student progress in each of the areas are also discussed.

Charner, Kathy, ed. *The GIANT Encyclopedia of Science Activities*. Gryphon House, 1998.

Offers activities designed to stimulate children's scientific curiosity by asking them to make observations, formulate questions and develop simple experiments. Students also discover how to communicate what they learn by writing, drawing and speaking.

Cohen, Richard and Betty Phillips Tunick. *Snail Trails and Tadpole Tails: Nature Education for Young Children*. Redleaf Press, 1997.

Describes projects that focus on caring for small animals throughout their life cycles. Each unit focuses on the life cycle of a different creature including: worms, tadpoles, silkworms, praying mantises, and snails.

Copley, J.V., ed. *Mathematics in the Early Years*. National Council of Teachers of Mathematics and National Association for the Education of Young Children, 1999.

Early childhood scholars discuss ways to enhance young children's mathematical understanding.

Dialogue on Early Childhood Science, Mathematics, and Technology Education American Association for the Advancement of Science, 1999.

This book summarizes discussions that occurred at the Forum on Early Childhood Science, Mathematics, and Technology Education. Focuses on the appropriateness of teaching math, science and technology to preschool children.

Falk, John H., Robert L. Pruitt, II, Kristi S. Rosenberg and Tali A. Katz. *Bubble Monster and Other Science Fun*. Chicago Review Press, 1998.

Science activities developed by the YWCA Science Minders Project teach children about the human body, patterns, matter and other areas of scientific discovery.

Klein, Alice, Prentice Starkey and Ann Wakeley. *Enhancing Pre-Kindergarten Children's Readiness for School Mathematics* (Paper presented at the Annual Meeting of the American Educational Research Association, Montreal, Quebec, Canada, April 19-23, 1999).

This study centered on the effect of pre-kindergarten mathematics preparation on early math ability. Compared a group of preschool children who had received preschool math instruction and a group that had not received preschool math instruction.

Klein, Alice, Prentice Starkey and Ann Wakely. *Supporting Pre-Kindergarten Children's Readiness for School Mathematics* (Presented at the NIECDE Project Director's Meeting, Washington, DC June 8-10, 1998).

This study surveyed preschool teachers and parents concerning children's mathematics readiness. The survey revealed teacher and parent attitudes concerning children's math knowledge. The survey also addressed the extent of math activities at home and in the classroom.

Kohl, Mary Ann F. and Cindy Gainer. *Good Earth Art: Environmental Art for Kids*. Bright Ring, 1991.

There are more than 200 activities in this resource that promote environmental awareness among students.

Kohl, Mary Ann F. and Cindy Gainer. *MathArts: Exploring Math Through Art for 3 to 6 Year Olds*. Gryphon House, 1996.

Introduces students to basic math functions, such as counting, through the use of creative art projects.

Kohl, Mary Ann F. and Jean Potter. *ScienceArts: Discovering Science Through Art Experiences*. Bright Ring, 1993.

Art activities provide children a way to explore the world of science. Plants, crystals, light and constellations are some of the basic scientific phenomena that children observe.

Lind, Karen K. *Exploring Science in Early Childhood Education: A Developmental Approach*. 3rd. edition. Delmar, 2000.

Provides ideas for incorporating science into music, dramatic play, language, social studies and art activities. Offers structured, informal and naturalistic activity ideas, as well as advice on selecting appropriate science topics.

Lind, Karen K. *Science in Early Childhood: Developing and Acquiring Fundamental Concepts and Skills*

Paper presented at the Forum on Early Childhood Science, Mathematics, and Technology Education, 1998. Emphasizes the importance introducing children to science concepts as early as possible. Notes that science concepts can be introduced in formal and informal settings and stresses the importance of selecting cognitive-appropriate curriculum.

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Moomaw, Sally and Brenda Hieronymous. *More Than Counting Whole Math Activities for Preschool and Kindergarten*. Readleaf Press, 1995.

Suggests activities to broaden the math experience such as grid games, collections, path games, graphing and gross motor play.

Moomaw, Sally and Brenda Hieronymous. *Much More Than Counting More Math Activities for Preschool and Kindergarten*. Readleaf Press, 1999.

A sequel to *More Than Counting*, this book includes activity suggestions for estimating and patterning. Activity ideas include suggestions about how to organize the activity, necessary materials and a photograph.

Moomaw, Sally and Brenda Hieronymous. *More Than Magnets: Exploring the Wonders of Science in Preschool and Kindergarten*. Redleaf Press, 1999.

Describes over 100 activities in the areas of life science, physical science and chemistry. Teachers and caregivers can rely on the "What to Look For," "Scientific Information" and "Suggested Sequence" sections of the book to ask, as well as answer, questions of students.

Smith, Susan Sperry. *Early Childhood Mathematics Paper presented at the Forum on Early Childhood Science, Mathematics, and Technology Education*, 1998.

This paper discusses elements of early mathematics instruction, such as aiding children in identifying what they already understand about mathematics. There is a discussion of activities that involve counting, measuring and other basic mathematical applications.

Vondrak, Maripatricia. *The Effect of Preschool Education on Math Achievement* ERIC, 1996.

This study was undertaken to explore the impact of preschool on math achievement on minority, low-income students. A group that had attended preschool was compared with a group that had not attended preschool using standardized tests.

Waxman, Barbara, Nancy M. Robinson and Swapha Mukhopadhyaya. *Teachers Nurturing Math-Talented Young Children* National Center on the Gifted and Talented, 1996.

Offers techniques for identifying young children who have advanced math ability. Children received cognitive and psychometric testing at various points during the study and half of the children attended bi-weekly intervention sessions. Compared the results of the children who received intervention with those students who did not receive intervention.

Winnett, D., R. Rockwell, E. Sherwood and R. Williams. *Discovery Science: Explorations for the Early Year. Preschool Edition*. Readleaf Press, 2000.

Over 125 activities incorporate math and language skills into basic areas of scientific inquiry. Units include: How Objects Are Alike and Different, How Objects Move, How Objects Change, and How Objects Are Made and Used.

Wright, J.L. and D.D. Shade, eds. *Young Children: Active Learners in a Technological Age*. National Association of Educators for Young Children, 1994.

Experts on children and technology argue in favor of the introduction of computers into the early childhood classroom. Topics include choosing developmentally appropriate software and integrating technology to benefit children's cognitive and social development.

Videos

***Exploring Science and Nature* (28 min.) National Association for the Education of Young Children, 1995.**

Exploration is promoted as a way to introduce young children to concepts related to science and nature.

***Science: Anytime, Anyplace*. Magna Systems, Inc., 1995.**

A six-part series where 3 to 5-year olds are observed in different early childhood environments as they learn about different science concepts. Topics include: water, animals, plants, weather, light, sand, machines and the human body.

***Sharing Nature With Young Children*. (18 min.) South Carolina Educational Television.**

Discusses ways to translate a child's natural curiosity into situations where they can learn about science phenomena.

Internet Sites

American Association for the Advancement of Science: Project 2061

www.project2061.org/about/index.html

In 1985, the American Association for the Advancement of Science began a long-term effort to reform science education for the 21st century, and in particular to define science literacy. With the goal of bringing science to all Americans, the association teamed with scientists, mathematicians, and technologists, as well as school district groups. One of the results is a publication titled *Benchmarks for Science Literacy*, intended to be a tool for curriculum design. The web site contains the full-text of the Project's publications, as well as professional development opportunities for science educators.

A Head Start on Science

www.csulb.edu/~sci4kids

The Department of Science Education of California State University, Long Beach, in cooperation with the Head Start Program of the Long Beach Unified School District, is conducting a project entitled "A Head Start on Science" to develop a summer institute prototype for Head Start teachers, teacher assistants, and home visitors. The project's main goal is to instill a lifelong interest in science for the participants and the children and families with whom they work. This web site provides a description of the project, lists sample science activities for children, and gives contact information for teacher training opportunities.

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Kids Domain: Mattie's Preschool Math Games

www.kidsdomain.com/down/pc/mattiesprep2.html

Children play interactive games that teach them about shapes and counting. The program also gives children the opportunity to create their own musical composition as a way of teaching them about the mathematical relevance of the differences between note values. Children develop their analytical and problem-solving skills in response to situations posed by the program.

Kinder Art Littles Dinosaur Math

<http://www.kinderart.com/littles/dinosaur.htm>

In this activity, children use dog bones of different sizes to compare shapes, colors and sizes. They make patterns by tracing bones onto white paper. Working in pairs, children also roll dice and remove from a bag the number of bones that corresponds to each roll of the dice.

Light Span Study Web Links for Learning: Professional Development

<http://www.studyweb.com/links/5013.html>

Provides links to online science activities developed by a variety of providers. Children can learn how pulleys work, how energy is stored, how water circulates in celery and about a great many other science topics.

National Association for the Education of Young Children (NAEYC) Position Statement on School Readiness

www.naeyc.org/about/about_index.htm

The National Association for the Education of Young Children (NAEYC) is the largest national organization of early childhood professionals and others devoted to improving the quality of early childhood education programs for children birth through age eight. NAEYC's Position Statements provide summaries of critical issues in early childhood education with conclusions and recommendations that have been backed by the Association's leadership.

National Council of Teachers of Mathematics

www.nctm.org

The National Council of Teachers of Mathematics (NCTM) is a national nonprofit organization dedicated to improving the teaching and learning of mathematics. It strives to ensure an excellent mathematics education for all students by providing an opportunity for every mathematics teacher to grow professionally. The NCTM web site provides math teachers with classroom activities, professional development opportunities, and access to NCTM's product and conference information. Also included on the site is a "Family Corner" where parents can find mathematics activities for to do at home.

National Science Teachers Association

www.nsta.org

The National Science Teachers Association (NSTA) was founded in 1944 and is dedicated to promoting excellence and innovation in science education for all. In addition to providing information about ordering the association's journals and materials, this web site provides professional development information, upcoming conference and meeting details, and classroom science activities.

PBS Teacher Source: 2x2=Math

<http://www.pbs.org/teachersource/math/preschool.shtm>

Describes several different basic math activities that involve numbers and counting. An online activity sheet gives children practice counting everyday objects, while a second exercise asks them to count backwards from 10 to 1. The activities also introduce children to the concepts of sharing, cooperation and patience.

PBS Teacher Source: Science and Technology

http://www.pbs.org/teachersource/science_tech/preschool.shtm

Describes activities that teach children to make a parachute and create a mobile consisting of items that can be found in nature. Other activities include asking children to pretend they are astronauts, studying how things grow, learning about the care of pets and animals, and recycling.

ReadyWeb

<http://Readyweb.crc.uiuc.edu>

ReadyWeb is an electronic collection of resources on school readiness sponsored by the ERIC Clearinghouse on Elementary and Early Childhood Education at the University of Illinois at Urbana-Champaign. On the ReadyWeb site you will find a virtual library of the full text of documents and articles, and links to other documents and articles, on the topic of school readiness. ReadyWeb also provides bibliographies of documents and journal articles from the ERIC database.

SAMI (Science and Math Initiatives)

www.learner.org/sami/index.html

SAMI is a clearinghouse of resources, funding, and curriculum for rural math and science teachers. Educators can find both math and science resources, as well as free software, lesson plans and materials.