ED380308 1995-00-00 Making Mathematical Connections in the Early Grades. ERIC Digest.

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Making Mathematical Connections in the Early

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Of all of the reform recommendations being made by the National Council of Teachers of Mathematics, making mathematical connections is among the more difficult to achieve, yet is so helpful in motivating students in the early grades. Mathematical connections can relate mathematical topics to students' daily lives and to other mathematical topics but are probably most important in relating mathematics to other curriculum areas. These connections help students understand mathematics better and see it as a useful and interesting subject to study.

This digest gives samples of activities appropriate for use in the early grades to connect mathematics to other subjects. Resources are listed by subject area and are drawn from a longer annotated bibliography of mathematical connections available from ERIC/CSMEE (see end note).

LANGUAGE ARTS

"A + B = 1, 2, 3 (Language Arts/Mathematics Connection)" is a collection of teaching materials to connect language arts and mathematics. Materials in the collection include: (1) a statement of fundamental assumptions about language, literacy, and learning; (2) objectives for mathematics as communication; (3) discussion of a new approach to teaching mathematics that draws on the best features of language teaching; and (4) numerous class activities such as giving and following directions, techniques of shared reading, a place value mat, a description of learning logs, making a math story, collecting and organizing data, and examples of how poems can be part of a mathematics lesson. A 220-item bibliography is included.
Lim, J. A., & Abell-Victory, J. (1991, May). A + B = 1, 2, 3 (Language arts/mathematics connection). Workshop presented at the Annual Meeting of the International Reading Association, Las Vegas, NV. (ED 335 637)

"Links to Literature: The Most Important Thing Is..." describes the use of Margaret Wise Brown's "The Important Book" to involve students in writing about defining qualities and attributes of geometric shapes.

Bertheau, M., & Thiessen, D. (1994, October). Links to literature: The most important thing is.... Teaching Children Mathematics, 1(2), 112-115.

"Thinking About Fractions (Writing in Mathematics Class)" describes two activities in a second-grade class that use drawing and writing to explore fractions.

Burns, M. (1992, November-December). Thinking about fractions (Writing in mathematics class). Writing Notebook: Visions for Learning, 10(2), 38, 43.

"Using Language Arts to Promote Mathematics Learning" considers four language arts--speaking, listening, reading, and writing--as activities that enhance the development of mathematical concepts. Suggests ways language arts can be used in learning difficult concepts such as missing addends, algorithms, number facts, and problem solving. Lists 39 references.

Burton, G. M. (1992, Summer). Using language arts to promote mathematics learning. Mathematics Educator, 3(2), 26-31.

Literature that explores mathematical concepts is a natural tool for attaining the goals of the NCTM Standards. "The Wonderful World of Mathematics: A Critically Annotated List of Children's Books in Mathematics" provides reviews of approximately 500 books in mathematics for preschool through grade 6. Each review describes the content of the book and rates its usefulness in teaching mathematical concepts. The books are classified into four main categories: (1) early number concepts, (2) number extensions and connections, (3) measurement, and (4) geometry and spatial sense. Two indexes list the books by author and by title.

Thiessen, D., & Matthias, M. (Eds.). (1992). The wonderful world of mathematics: A critically annotated list of children's books in mathematics. Reston, VA: National Council of Teachers of Mathematics. (ED 355 124)

SCIENCE

"Activities for Teaching K-6 Math/Science Concepts" is a revised edition of one of the products of a project, "Teaching Mathematics and Science Concepts, K-6," funded by the New York State Department of Education. This book contains lesson ideas that reflect the belief that science and mathematics are opposite sides of the same coin. Activities in this booklet (1) combine important mathematics and science in a single lesson; (2) have been tried out by classroom teachers and elementary school children; (3) involve "hands-on" activities; (4) use readily available, everyday materials; and (5) can be used as the basis for further activities. Included is a list of free and inexpensive materials that are useful in teaching science and mathematics and which include everything needed for the activities in this booklet. The topics of geometry, shapes, the earth, measuring, counting, inclined planes, work, gravity, friction, observing, classifying, angles, dew point, probability, symmetry, variation in nature, metric system, data collecting, estimation, ratios, proportion, melting, freezing, graphs, inferring, patterns, feeding and locomotion of animals, adaptations in animals, volume, ground water, and water supply are presented. A section "Sources of Further Ideas" contains a brief list of professional journals, teacher idea/reference books, and curriculum projects, along with a list of useable junk.

Farmer, W. A., & Farrell, M. A. (1989). Activities for teaching K-6 math/science concepts. Bowling Green, OH: School Science and Mathematics Association (126 Life Sciences Building, Bowling Green State University, Bowling Green, OH 43403-0256). (ED 347 051)

"IDEAS" connects science and mathematics in a series of activities related to the heart. Worksheets designed for multiple grade levels investigate (1) How Big Is Your Heart? (levels K-2); (2) Every Beat of Your Heart (levels 3-4); (3) What's the Beat? (levels 5-6), and (4) Heartifacts (levels 7-8). Extensions of the activities are discussed.

Passarello, L. M., & Fennell, F. (1992, February). IDEAS. Arithmetic Teacher, 39(6), 32-39.

"SSMiles" presents five integrated mathematics and science lessons in which students investigate the characteristics, behavior, lifecycles, and motion of mealworms and the feasibility of raising mealworms for profit. Purpose, time, materials needed, procedures, and extensions for each activity are discussed.

Tracy, D. M. (Ed.). (1993, October). SSMiles. School Science and Mathematics, 93(6), 332-337.

SOCIAL STUDIES

"Data Buddies: Primary-Grade Mathematicians Explore Data" describes a project for first- and second-graders involving gathering and interpreting survey data from a student they have never met in order to identify the student at the end of the project. Includes sample curricular goals and instructional strategies.
Bloom, S. J. (1994, October). Data buddies: Primary-grade mathematicians explore data. Teaching Children Mathematics, 1(2), 80-86.

"Early Childhood Corner: Calendar Reading: A Tradition That Begs Remodeling" describes the construction of a children's calendar for use in school, including development of time concepts, developing event recording systems, daily and weekly schedules of events, multiple-week schedules of events, and a day-date calendar.

Schwartz, S. L. (1994, October). Early childhood corner: Calendar reading: A tradition that begs remodeling. Teaching Children Mathematics, 1(2), 104-109.

"Social Math: Teacher's Resources" presents recommended resources for implementing activities in social mathematics, an instructional approach created by combining numerical information with social studies concepts. Describes ways to generate historical timelines, create family histories, and collect and interpret numerical data.

Porter, P. (Ed.). (1993, September-October). Social math: Teacher's resources. Social Studies and the Young Learner, 6(1), 25-27.

"World Cultures in the Mathematics Class" introduces a cultural perspective into the teaching of mathematics. Describes the mathematical practices of African peoples and of the indigenous peoples of the Americas in relationship to numbers and numeration, design and pattern, architecture, and games of chance and skill.

Zaslavsky, C. (1991, June). World cultures in the mathematics class. For the Learning of Mathematics, 11(2), 32-36.

ARTS

"IDEAS" presents a thematic approach to curriculum that enables students to connect topics and supports meaningful inquiry. Presents four activities for levels K-2, 3-4, 5-6, and 7-8 in which students explore problems of interest involving the theme of construction and architecture. Includes reproducible worksheets.
Brahier, D. (Ed.). (1993, February). IDEAS. Arithmetic Teacher, 40(6), 325-337.

"Math in Motion: Origami in the Classroom" presents techniques and activities to teach mathematics using origami paper folding. Part 1 includes a history of origami, mathematics and origami, and careers using mathematics. Parts 2 and 3 introduce paper folding concepts and teaching techniques, including low-budget paper resources. Part 4 includes a lesson plan guide and interdisciplinary cross-reference chart. Part 5 includes paper-folding projects and activities using the square, rectangle, and triangle. Part 6 offers cultural and educational enrichment activities, including math journals, thought-of-the-week quotations, Japanese fan, haiku, fortune cookie recipe, Japanese vocabulary of numbers and common words, tangram puzzles, origami mobile, the thousand cranes story, and a cooperative learning activity about diagramming. Teacher scripts are included with some lessons. Staff development, family, and student workshops are also available.

Pearl, B. (1994). Math in motion: Hands-on math: Origami in the classroom. Newport Beach, CA: Author (2417 Vista Hogar, Newport Beach, CA 97660). (714) 721-0633. (ED 377 035)

"Word Problems and the Language Connection" presents the method of employing student-written playlets and a technique called "stage freeze" to help students identify appropriate operations during problem solving. Provides five sample playlets, a description of the method, and several benefits from using the method.

Matz, K. A., & Leier, C. (1992, April). Word problems and the language connection. Arithmetic Teacher, 39(8), 14-17.

THEMATIC APPROACH

"Empowering Students With 'The Math Connection'" discusses a children's television show, The Math Connection, which shows connections between mathematics and daily pursuits of local workers and tries to improve attitudes of students and teachers towards mathematics. Describes the content and structure and the open-ended problems on which students work to prepare for the show.
Rosnick, P. (1994, May). Empowering students with "The Math Connection." Arithmetic Teacher, 41(9), 513-517.

"Math Safari" describes a mathematical, scientific, geographic, informational adventure for fourth-grade students. It integrates all curriculum areas and other skills by using information children must find in books to pose math problems about animals. It encourages cooperative learning, critical reading, analysis, and use of research skills.

Nelson, V., & Stanko, A. (1992, August). Math safari. Learning, 21(1), 43-45.

"Wet and Wild Water" uses a thematic approach to show the integration of subjects (reading, mathematics, language arts, science/fine arts) and skills to create a context for learning. There are six major topics in the guide, each with subtopics: (1) Getting Your Feet Wet--An Introduction to Water; (2) Fishy Business--Applying Economics; (3) The Big Splash--Water Sports, Athletes, and Water Animals; (4) Where in the World--Famous Explorers of the Past; (5) Water Mysteries--Myths, Legends, and Strange Occurrences (Loch Ness Monster and Atlantis); and (6) Join Hands for Tomorrow's Water--Global Responsibility. Under each topic is an indication of the core knowledge required, a description of the activity, directions for a water experiment, and a list of books and resources for the teacher.

Indiana State Department of Education. (1990). Wet and wild water. Indianapolis: Center for School Improvement and Performance. (ED 338 478)

NOTE

The items listed above are drawn from a longer annotated bibliography of mathematical connections available for $1.95 from ERIC/CSMEE, 1929 Kenny Road, Columbus, OH 43210-1080. For a complete list of publications in mathematics, science, and environmental education available from ERIC/CSMEE, call 1-800-276-0462.

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current free and low-cost publications, contact ACCESS ERIC: 1-800-LET-ERIC.

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