The Need for Mathematics in a Changing World

From the National Council of Teachers of Mathematics (NCTM), *Principles and Standards for School Mathematics:*

We live in a time of extraordinary and accelerating change. New knowledge, tools, and ways of doing and communicating mathematics continue to emerge and evolve. Calculators, too expensive for common use in the early eighties, now are not only commonplace and inexpensive but vastly more powerful. Quantitative information available to limited numbers of people a few years ago is now widely disseminated through popular media outlets.

The need to understand and be able to use mathematics in everyday life and in the workplace has never been greater and will continue to increase. For example:

- *Mathematics for life.* Knowing mathematics can be personally satisfying and empowering. The underpinnings of everyday life are increasingly mathematical and technological. For instance, making purchasing decisions, choosing insurance or health plans, and voting knowledgeably all call for quantitative sophistication.
- *Mathematics as a part of cultural heritage.* Mathematics is one of the greatest cultural and intellectual achievements of human-kind, and citizens should develop an appreciation and understanding of that achievement, including its aesthetic and even recreational aspects.
- *Mathematics for the workplace.* Just as the level of mathematics needed for intelligent citizenship has increased dramatically, so too has the level of mathematical thinking and problem solving needed in the workplace, in professional areas ranging from health care to graphic design.
- *Mathematics for the scientific and technical community.* Although all careers require a foundation of mathematical knowledge, some are mathematics intensive. More students must pursue an educational path that will prepare them for lifelong work as mathematicians, statisticians, engineers, and scientists.

In this changing world, those who understand and can do mathematics will have significantly enhanced opportunities and options for shaping their futures. Mathematical competence opens doors to productive futures. A lack of mathematical competence keeps those doors closed. NCTM challenges the assumption that mathematics is only for the select few. On the contrary, everyone needs to understand mathematics. All students should have the opportunity and the support necessary to learn significant mathematics with depth and understanding. There is no conflict between equity and excellence.

Principles and Standards calls for a common foundation of mathematics to be learned by all students. This approach, however, does not imply that all students are alike. Students exhibit different talents, abilities, achievements, needs, and interests in mathematics. Nevertheless, all students must have access to the highest-quality mathematics instructional programs. Students with a deep interest in pursuing mathematical and scientific careers must have their talents and interests engaged. Likewise, students with special educational needs must have the opportunities and support they require to attain a substantial understanding of important mathematics. A society in which only a few have the mathematical knowledge needed to fill crucial economic, political, and scientific roles is not consistent with the values of a just democratic system or its economic needs.

Performance Standards for Mathematics

New Standards Performance Standards, National Center on Education and the Economy and the University of Pittsburgh, 1997.

The First Four Standards are The Important Conceptual Areas of Mathematics:
• Arithmetic and Number Concepts (Table 1) • Geometry and Measurement Concepts (Table 2) • Function and Algebra Concepts (Table 3) • Statistics and Probability Concepts (Table 4)

Complementing The Conceptual Understanding Standards, The Following Focus on Areas of The Mathematics Curriculum That Need Particular Attention and a New or Renewed Emphasis:
• Problem Solving and Reasoning (Table 5) • Mathematical Skills and Tools (Table 6) • Mathematical communication (Table 7) • Putting Mathematics to Work (Table 8)

Table 1

Arithmetic and Number Concepts

The student demonstrates understanding of a mathematical concept by using it to solve problems, representing it in multiple ways (through numbers, graphs, symbols, diagrams, or words, as appropriate), and explaining it to someone else. All three ways of demonstrating understanding-use, represent, and explain-are required to meet this standard.

A. Adds, subtracts, multiplies, and divides whole numbers, with and without calculators; that is:
   - adds, i.e., joins things together, increases
   - subtracts, i.e., takes away, compares, finds the difference
   - multiplies, i.e., uses repeated addition, counts by multiples, combines things that come in groups, makes arrays, uses area models, computes simple scales, uses simple rates
   - divides, i.e., puts things into groups, shares equally; calculates simple rates
   - analyzes problem situations and contexts in order to figure out when to add, subtract, multiply, or divide
   - solves arithmetic problems by relating addition, subtraction, multiplication, & division to one another
   - computes answers mentally, e.g., 27 + 45, 30 x 4
   - uses simple concepts of negative numbers, e.g., on a number line, in counting, in temperature, "owing"

B. Demonstrates understanding of the base ten place value system and uses this knowledge to solve arithmetic tasks; that is:
   - counts 1, 10, 100, or 1,000 more than or less than, e.g., 1 less than 10,000, 10 more than 380, 1,000 more than 23,000, 100 less than 9,000
   - uses knowledge about ones tens, hundreds, and thousands to figure out answers to multiplication and division tasks, e.g., 36 x 10, 18 x 100, 7 x 1,000, 4,000 ÷ 4

C. Estimates, approximates, rounds off, uses landmark numbers, or uses exact numbers, as appropriate, in calculations

D. Describes and compares quantities by using concrete and real world models of simple fractions; that is:
   - finds simple parts of wholes
   - recognizes simple fractions as instructions to divide, e.g., ¼ of something is the same as dividing something by 4
   - recognizes the place of fractions on number lines, e.g., in measurement
   - uses drawings, diagrams, or models to show what the numerator and denominator mean, including when adding like fractions, e.g., 1/8 + 5/8, or when showing that ¾ is more than 3/8
   - uses beginning proportional reasoning and simple ratios, e.g., "about half of the people."

E. Describes and compares quantities by using simple decimals; that is:
   - adds, subtracts, multiplies, and divides money amounts
   - recognizes relationships among simple fractions, decimals, and percents, i.e., that ½ is the same as 0.5, and ½ is the same as 50%, with concrete materials, diagrams, and in real world situations, e.g., when discovering the chance of a coin landing on head or tails.

F. Describes and compares quantities by using whole numbers up to 10,000; that is:
   - Connects ideas of quantities to the real world, e.g., how many people fit in the school's cafeteria; how far away is a kilometer
   - finds, identifies, and sorts numbers by their properties, e.g., odd, even, multiple, square.

Table 2

Geometry and Measurement Concepts

The student demonstrates understanding of a mathematical concept by using it to solve problems, representing it in multiple ways (through numbers, graphs, symbols, diagrams, or words, as appropriate), and explaining it to someone else. All three ways of demonstrating understanding-use, represent, and explain-are required to meet this standard.

The student produces evidence that demonstrates understanding of geometry and measuring concepts; that is the student:

A. Visualizes and represents two dimensional views of simple rectangular three dimensional shapes, e.g., by showing the front view and side view of a building made of cubes

B. Uses simple two dimensional coordinate systems to find locations on a map, and represent points and simple figures

C. Uses many types of figures (angles, triangles, squares, rectangles, rhombi, parallelograms, quadrilaterals, polygons, prisms, pyramids, cubes, circles, and spheres) and identifies the figures by their properties, e.g., symmetry, number of faces, two- or three-dimensionality, no right angles.

D. Solves problems by showing relationships between and among figures, e.g., using congruence and similarity, and using transformations including flips, slides, and rotations.

E. Extends and creates geometric patterns using concrete and pictorial models

F. Uses basic ways of estimating and measuring the size of figures and objects in the real world, including length, width, perimeter, and area.

G. Uses models to reason about the relationship between the perimeter and area of rectangles in simple situations.

H. Selects and uses units, both formal and informal as appropriate, for estimating and measuring quantities such as weight, length, area, volume and time.

I. Carries out simple unit conversions, such as between cm and m, and between hours and minutes

J. Uses scales in maps, and uses, measures, and creates scales for rectangular scale drawings based on work and concrete models and graph paper.

Table 3

Function and Algebra Concepts

The student demonstrates understanding of a mathematical concept by using it to solve problems, representing it in multiple ways (through numbers, graphs, symbols, diagrams, or words, as appropriate), and explaining it to someone else. All three ways of demonstrating understanding-use, represent, and explain-are required to meet this standard.

The student produces evidence that demonstrates understanding of function and algebra concepts; that is the student:

A. Uses linear patterns to solve problems; that is:
   - Shows how one quantity determines another in a linear ("repeating") pattern, i.e., describes, extends, and recognizes the linear pattern by its rule, such as, the total number of legs on a given number of horses can be calculated by counting by fours
   - shows how one quantity determines another quantity in a functional relationship based on a linear pattern, e.g., for the "number of people and total number of eyes," figure out how many eyes 100 people have all together.

B. Builds iterations of simple non-linear patterns, including multiplicative and squaring patterns (e.g., "growing" patterns) with concrete materials, and recognizes that these patterns are not linear.

C. Uses the understanding that an equality relationship between two quantities remains the same as long as the same change is made to both quantities.

D. Uses letters, boxes, or other symbols to stand for any number, measured quantity, or object in simple situations with concrete materials, i.e., demonstrates understanding and use of a beginning concepts of a variable.

Table 4

Statistics and Probability Concepts

The student demonstrates understanding of a mathematical concept by using it to solve problems, representing it in multiple ways (through numbers, graphs, symbols, diagrams, or words), and explaining it to someone else. All three ways of demonstrating understanding-use, represent, and explain-are required to meet this standard.

The student produces evidence that demonstrates understanding of statistics and probability concepts in the following areas; that is, the student:

A. Collects and organizes data to answer a question or test a hypothesis by comparing sets of data.

B. Displays data in line plots, graphs, tables, and charts

C. Makes statements and draws simple conclusions based on data; that is:
   - reads data in line plots, graphs, tables and charts
   - compares data in order to make true statements, e.g., "seven plants grew at least 5 cm"
   - identifies and uses the mode necessary for making true statements, e.g., "more people chose red"
   - makes true statements based on simple concept of average (median and mean), for a small sample size and where the situation is made evident with concrete materials or clear representations
   - interprets data to determine the reasonableness of statements about the data, e.g., "twice as often," "three times faster"
   - uses data including statements about the data, to make a simple concluding statement about a situation, e.g., "This kind of plant grows better near sunlight because the seven plants that were near the window grew at least 5 cm."

D. Gathers data about an entire group or by sampling group members to understand the concept of sample, i.e., that a large sample leads to more reliable information, e.g., when flipping coins.

E. Predicts results, analyzes data, and finds out why some results are more likely, less likely, or equally likely.

F. Finds all possible combinations and arrangements within certain constraints involving a limited number of variables.

Table 5

Problem Solving and Reasoning

The student demonstrates logical reasoning throughout work in mathematics, i.e., concepts and skills, problem solving, and projects; demonstrates problem solving by using mathematical concepts and skills to solve non-routine problems that do not lay out specific and detailed steps to follow; and solves problems that make -demands on all three aspects of the solution process-formulation, implementation, and conclusion.

A. Formulation.
Given the basic statement of a problem situation, the student:
- makes the important decisions about the approach, materials, and strategies to use, i.e., does not merely fill in a given chart, use a pre-specified manipulative, or go through a predetermined set of steps
- uses previously learned strategies, skills, knowledge, and concepts to make decisions
- uses strategies, such as using manipulatives or drawing sketches, to model problems.

B. Implementation.
The student makes the basic choices involved in planning and carrying out a solution; that is the student:
- makes up and uses a variety of strategies and approaches to solving problems and uses or learns approaches that other people use, as appropriate
- makes connections among concepts in order to solve problems
- solves problems in ways that make sense and explains why these ways make sense, e.g., defends the reasoning, explains the solution

C. Conclusion
The student moves beyond a particular problem by making connections, extensions, and/or generalizations; for example, the student:
- explains a pattern that can be used in similar situations
- explains how the problem is similar to other problems he or she has solved
- explains how the mathematics used in the problem is like other concepts in mathematics
- explains how the problem solution can be applied to other school subjects and in real world situations
- makes the solution into a general rule that applies to other circumstances

Table 6

Mathematical Skills and Tools

The student demonstrates fluency with basic and important skills by using these skills accurately and automatically, and demonstrates practical competence and persistence with other skills by using them effectively to accomplish a task, perhaps referring to notes, books, or other students, perhaps working to reconstruct a method; that is, the student:

A. Adds, subtracts, multiplies, and divides whole numbers correctly; that is:
   - knows single digit addition, subtraction, multiplication, and division facts
   - adds and subtracts numbers with several digits
   - multiplies and divides numbers with one or two digits
   - multiplies and divides three digit numbers by one digit numbers

B. Estimates numerically and spatially

C. Measures length, area, perimeter, circumference, diameter, height, weight, and volume accurately in both the customary and metric systems

D. Computes time (in hours and minutes) and money (in dollars and cents).

E. Refers to geometric shapes and terms correctly with concrete objects or drawings, including triangle, square, rectangle, side, edge, face, cube, point, line, perimeter area, and circle; and refers with assistance to rhombus, parallelogram, quadrilateral, polygon, polyhedron, angle, vertex, volume, diameter, circumference, sphere, prism, and pyramid.

F. Uses +, -, x, ÷, /, √, $, c, %, and **.** (decimal point) correctly in number sentences and expressions.

G. Reads, creates, and represents data on line plots, charts, tables, diagrams, bar graphs, simple circle graphs, and coordinate graphs.

H. Uses recall, mental computations, pencil and paper, measuring devices, mathematics texts, manipulatives, calculators, computers, and advice from peers, as appropriate, to achieve solutions.; that is, uses measuring devices, graded appropriately for given situations, such as rulers (customary to the 1/8 inch; metric to the millimeter), graph paper (customary to the inch or half-inch; metric to the centimeter), measuring cups (customary to the ounce; metric to the milliliter), and scales (customary to the pound or ounce; metric to the kilogram or gram).

Table 7

Mathematical Communication

The student uses the language of mathematics, its symbols, notation, graphs, and expressions, to communicate through reading, writing, speaking, and listening, and communicates about mathematics by describing mathematical ideas and concepts and explaining reasoning and results; that is, the student:

- Uses appropriate mathematical terms, vocabulary, and language, based on prior conceptual work.
- Shows mathematical ideas in a variety of ways, including words, numbers, symbols, pictures, charts, graphs, tables, diagrams, and models
- Explains solutions to problems clearly and logically, and supports solutions with evidence, in both oral and written work.
- Considers purpose and audience when communicating about mathematics.
- Comprehends mathematics from reading assignments and from other sources.

Table 8

Putting Mathematics to Work

The student conducts at least one large scale project each year, beginning in fourth grade, drawn from the following kinds and, over the course of elementary school, conducts projects drawn from at least two of the kinds. A single project may draw on more than one kind.

A. Data study, in which the student:
   - develops a question and a hypothesis in a situation where data could help make a decision or recommendation
   - decides on a group or groups to be sampled and makes predictions of the results, with specific percents, fractions, or numbers
   - collects, represents, and displays data in order to help make the decision or recommendation; compares the results with the predictions
   - writes a report that includes recommendations supported by diagrams, charts, and graphs, and acknowledges assistance received from parents, peers, and teachers.

B. Science study in which the student:
   - decides on a specific science question to study and identifies the mathematics that will be used, e.g., measurement
   - develops a prediction (a hypothesis) and develops procedures to test the hypothesis
   - collects and records data, represents and displays data, and compares results with predictions

- writes a report that compares the results with the hypothesis; supports the results with diagrams, charts and graphs; acknowledges assistance received from parents, peers, and teachers.

C. Design of a physical structure, in which the student:
   - decides on a structure to design, the size and budget constraints, and the scale of design
   - makes a first draft of the design, and revises and improves the design in response to input from peers and teachers
   - makes a final draft and report of the design, drawn and written so that another person could make the structure; acknowledges assistance received from parents, peers, and teachers.

D. Management and planning, in which the student:
   - decides on what to manage or plan, and the criteria to be used to see if the plan worked
   - identifies unexpected events that could disrupt the plan and further plans for such contingencies
   - identifies resources needed, e.g., materials, money, time, space, and other people
   - writes a detailed plan and revises and improves the plan in response to feedback from peers and teachers
   - carries out the plan (optional)
   - writes a report on the plan that includes resources, budget, and schedule, and acknowledges assistance received from parents, peers, and teachers.

E. Pure mathematics investigation, in which the student:
   - decides on the area of mathematics to investigate, e.g., numbers, shapes, patterns
   - describes a question or concept to investigate
   - decides on representations that will be used, e.g., numbers, symbols, diagrams, shapes, or physical models
   - carries out the investigation
   - writes a report that includes any generalization drawn from the investigation, and acknowledges assistance received from parents, peers, and teachers.

Illuminations (Mathematics Standards)

The Illuminations website is based on the *National Council of Teachers of Mathematics'* Principles and Standards for School Mathematics and is a gateway to teaching and learning standards-based mathematics. Principles and Standards for School Mathematics describes what mathematics students should learn and provides guidelines for teaching mathematics, as well as for assessing student progress.

The site provides extensive internet resources to "illuminate the Standards" for improving the teaching and learning of mathematics for all students from K-12. The site contains for each grade band five sections; multimedia math lessons, selected math web resources, classroom-ready lessons, interactive lessons, and videos that reflect vignettes of teaching and learning.

Please go to the Illuminations website at http://illuminations.nctm.org/index2.html.

Math Power and Probing Questions

Selected activities from *Math Power at Home, Math Power in the Community,* and *Math Power in School,* edited by Gerald Kulm, and *Girl Scouts' Science and Mathematics Leaders' Guide,* by Marsha Lakes Matyas, June B. Combs, and Emily Ehrenfeld. Washington, DC: American Association for the Advancement of Science, 1990 and 1991.

The Leader's Role

The first thing to remember is that you do not have to be a licensed teacher or a mathematician to help someone learn and enjoy mathematics. The activities are designed so that you can use them in various ways. Depending on your own personality and style of working, you can be:

- a **leader** showing children how to do their best.
- a **partner** working together, sharing ideas and discoveries.
- a **coach** encouraging and demonstrating whenever necessary.
- a **friend** being supportive and accepting.
- a **parent** aware and caring about needs and progress.
- a **model** being interested and excited about learning mathematics.

Most of all, be yourself and a role model who enjoys getting involved and doing some work and learning. Be willing to explore and make mistakes. Your attitude and energy are much more important that what you know about mathematics. In the words of Jaime Escalante, "you've got to have *ganas* (desire)."

About Mathematics

It is important that children develop the mathematical skills and concepts they need for algebra, geometry, calculus, and other high school courses. But unless they learn to enjoy mathematical thinking and see the usefulness of mathematics, many children are unlikely to reach their potential.

Children often think of mathematics as being only about numbers. They see it as abstract and difficult with no useful applications. The activities are designed to emphasize mathematics that involves:

- **estimating:** finding an answer that is "close enough." Most real problems involve finding more than just one exact answer.
- **finding information:** looking at a situation and figuring out what to do and what strategy to use is more important that just "crunching numbers."
- **planning:** knowing what to do first and what steps to follow is the way real math problems are solved.
- **visualizing:** being able to picture a situation or problem and represent it in a drawing or diagram.
- **organizing:** putting information in order, using tables, graphs, and lists to see patterns and make sense of what is known and what is to be found.

About Learning Mathematics

All too often, the mathematics that children learn in school is mostly rules and memorization. There is no question that learning and understanding anything completely, including mathematics, involves hard work and effort. But hard work can also bring the enjoyment of discovery and the satisfaction of solving a problem.

The activities are intended to show that learning mathematics can be enjoyable. Learning mathematics this way can involve:

- **cooperation:** working together to solve a problem, not competing to see who can finish first.
- **enjoyment:** experiencing success in solving a problem or learning a new idea.
- **hands-on activity:** measuring, drawing, building things.
- **real-life applications:** using mathematics to explore ideas and solve problems that occur in everyday life.
- **seeing patterns:** exploring the design, size, and shape of objects and ideas.
- **problem solving:** using common sense, trial and error, and reasoning to find answers to questions.

The intent of the activities is to help children gain experiences that will motivate and encourage further interest in and study of mathematics; not to remediate or compensate for skills taught in school.

Some Specific Suggestions

Preparation

Working with children and doing activities requires planning and preparation. **Having everything ready ahead of time and being organized** can make learning mathematics and enjoyable experience.

- **Try the activity yourself first**. This will help you think of ways to improve or adapt the activity to your students. It will also help identify any trouble spots or need for extra planning.
- **Get supplies ahead of time.** Make sure that you have plenty of everything. Have extras on hand in case of mistakes or if you want to try something again.

Doing activities

The activities are designed to let students do things with a minimum of explanation and demonstration. Remember, your role is to be a coach and partner. If there is a trouble spot, encourage the youngster to try things out before stepping in to help. When you do help, try to provide hints and ask questions that lead in the right direction, rather than just giving the answer.

- **Use objects and materials.** Most of these are suggested in the activities, but feel free to adapt and use more suitable or more available materials. Experiment with the materials and do the hands-on work, too.

- **Focus on relationships, why things work, and on ideas.** Let the youngster explain what he or she is doing. Encourage questioning and figuring out why things happen; try not to accept an answer without understanding how he or she got it.

- **Take your time.** It is best to spend enough time so that the youngster understands and enjoys an activity. Rushing to cover more material can be frustrating. Try not to push too far too fast. It is better to stop while you are both enjoying yourselves, saving some anticipation for the next time.

- **Avoid long, complicated, paper-and-pencil calculations. Have a** calculator handy. In most cases, the actual calculation is not as important as how and why to combine the numbers. If the student understands why things work, he or she can push the right buttons on the calculator.

- **Avoid speed contests and competition.** Children can sometimes be motivated by competition, but the activities are designed to emphasize reflective thought and problem solving.

Asking questions

Some of the best teachers provide very little direct information to children. Instead, they ask questions and help children to discover for themselves. Try to practice asking questions that require more than just a "yes" or "no" answer. When you ask a question, **wait for an answer;** do not answer it yourself right away. Here are the kinds of questions you should try to ask:

- How did you figure that out?
- Why does it work that way?
- How you do you know?
- Is there another way to do it?
- What do you like about doing this?

Adapt and Personalize

Any book or written activity is a starting point and a source of ideas. Every situation is different, and only you know the kinds of activities and experiences that are likely to work best with your children.

Some of this knowledge comes through experience. You will make mistakes the first few tries. Use these mistakes to learn how to adapt and change the activities so they will be better the next time.

Sometimes you will be surprised. An activity that seems to be a sure winner will fall flat. Other times, children will do great with an activity that you think might be boring to them. The only way to find out is to try.

Once you try an activity, you will think of a lot of different approaches, ideas, and materials that you could use the next time. That is what makes working with children and learning with them so enjoyable.

Reprinted from *Math Power in the Community,* edited by Gerald Kulm. Washington, DC: American Association for the Advancement of Science, 1990. (Re-edited)

GREAT MATHEMATICS WEBSITES
For SEE Trainers*

http://www.nctm.org/ This is the official site of the National Council of Teachers of Mathematics. NCTM has been at the forefront of efforts to reform mathematics education for over seventy-five years. This site is a great source of information on a variety of topics such as exemplary lessons, grants information, recommended products and publications, as well as upcoming national and regional conferences.

http://www.mathforum.com/ The Math Forum is an award-winning site previously run by Swarthmore College. The current host, Drexel University, is doing an admirable job at maintaining the high quality that was Math Forum's trademark. This site contains a wealth of information including lessons, web units, discussion groups, Ask Dr. Math, professional development information, and great links to other reliable sites.

http://www.visualfractions.com/ Another award-winning site! Help your students overcome fractionitis (fear and anxiety caused by the appearance of fractions). This interactive site helps your students develop a conceptual understanding of fractions and the operations we perform on fractions.

http://www.pbs.org/teachersource/math.htm The PBS Mathline is supported by the U.S. Department of Education. Not only does this site contain standards-based lessons, it also models the lesson on the Mathline's searchable online videoclips. Another interesting feature of the PBS Mathline is the monthly focus on a topic that is always timely and informative.

http://www.galaxy.gmu.edu/~drsuper/Virtual_Manipulatives/virtual.htm This page provides over eighty links to interactive sites where your students can actually use virtual pattern blocks, tangrams, geoboards, and many other manipulatives commonly used in today's classrooms. This site is content-rich with lots of topics guaranteed to improve conceptual understanding.

http://www.figurethis.org/
Figure This! Mathematics Challenges for Families provides interesting math challenges that middle-school students can do at home with their families.

Figure This! Is designed to provide an exciting and family-friendly way to become more involved in learning math.

http://homepage.ntlworld.com/barry.r.clarke/zartpuzz.htm
This web site is intended for parents and mathematics teachers who are involved in teaching multiplication tables to students. Here, a simple and original system is developed which allows students to calculate results of multiplication using fingers. Although applicable for tables ito 9, it turns out that it is easiest to use for the 7, 8 and 9 multiplication facts.

* Compiled by Sue P. White, SEE National Project Manager, June 2002.

Ten Great Mathematics Web Sites for Parents and Children*

http://library.rider.edu/scholarly/rlackie/sci/
This web site contains many mathematics and science resources for parents of children from K-12.

http://www.ed.gov/pubs/parents/Math/mathhome.html
Helping Your Child Learn Math
U.S. Department of Education presents lessons about mathematics in everyday life. Contains mathematics activities for grades K-8.

http://teacher.scholastic.com/lessonrepro/lessonplans/instructor/letter.htm
Marilyn Burns, the mathematics educator, provides mathematics lessons for parents and children. K-Adult

http://www.mathgoodies.com/parents.shtm
This corner of Math Cats is for parents and children to experience open-ended and playful explorations of important mathematics concepts. Grades 5-8

http://www.eduplace.com/hac/figure.html
The Education Place includes elementary resources for teachers, students and parents. Included in this collection are many fun mathematics activities. Ages 5-12

http://www.apocalypse.org/pub/u/gilly/Schoolhouse_Rock/HTML/schoolhouse.html
Schoolhouse Rock is one of many artifacts from the 1970's that still is in existence today. In the mid-70s, ABC-TV aired these short cartoons, which taught a generation about mathematics. Grades 3-5.

http://www.efn.org/~dkostur/
Kostur's Postulate — hear and see counting from 1 to 15, for toddlers and preschool age children. Pre K-K

http://www.thinkquest.org/library/lib/site_sum_outside.html?tname=4116&cid=2&url=4116/
Online Math Applications explain the mathematics involved in investing, music, and science. Discusses the history of mathematics and shows how to use mathematics in daily life. The Stock Market game is particularly educational for young entrepreneurs. Good for kids of all ages.

http://www.cadburylearningzone.co.uk
Cadbury Leaning Zone - find out how mathematics is used in making chocolate and learn the history behind making chocolate through their fun activities. K-6

http://www.figurethis.org/
Figure This! — Have you been alive for one million minutes? Investigate mathematics challenges like this, which include hints, answers, and ways to test them out. Designed for kids and their families. Elementary-Secondary

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