



Bulletin

Parents Learning About Children's Education

The Massachusetts Statewide Parent Information & Resource Center (PIRC)

Available online in English, Spanish, and Portuguese at www.pplace.org



Parents, your involvement matters... IN MATH, TOO!



Just as your child needs reading skills to succeed, math skills are also key to your child's future. Success in the world of tomorrow depends on students being able to see math as a tool they can use every day. In Massachusetts, high school students must pass the 10th grade MCAS tests in math, as well as English language arts, to graduate. Studies show that students who learn algebra and geometry are more likely to go to college. And, many careers call for a sound base in mathematics. Examples include jobs in business, computers and other technology, carpentry, medicine, and landscaping. Plus, math skills will help your child to take control of her¹ life. From making good financial decisions like buying a car, to political decisions like who to vote for, we all need math to act powerfully in society.

As parents, you can help your children develop math skills and a positive attitude about math. And, you don't need any advanced math knowledge to do it! Here are nine suggestions for how you can help. Pick what is comfortable for you.

1. Your Attitude, Their Attitude: The feelings you express about math will affect how your children feel about math. So if you disliked math when you were in school, or math makes you nervous, try not to pass these feelings on to your children.

2. Everyday Math: Seeing how math is used in everyday life can really help children understand its importance. Talk about how you use math when grocery shopping, doing your taxes, doing household repairs, paying bills, etc. Encourage your children to help with these activities.

3. Math Every Day: Everyday activities offer many chances to help your child develop math skills. Keep an eye out for little math games you can do together. For example, at home you can play guessing games as to which mug, or glass, holds more. This helps build a child's concepts of size and shape. On car, bus, or subway trips you can practice:

- **counting**—i.e., how many red cars do you see?
- **shapes**—i.e., what shapes are the posters in the subway car?
- **comparing**—less/more, near/far, long/short. For example, are there more people standing up or sitting down on this bus?
- **measuring time**—i.e., if we need to be at school by 8 a.m., and it takes 20 minutes to get there, when should we leave?

Grocery store trips, setting the kitchen table, playing board and card games are other good times to entertain your kids and help them develop math

skills. For example, while setting the table you could say: "If there are five of us, and we are using forks, knives, and spoons, how many total pieces of silverware do you need to put on the table?"

4. High Expectations: Have high expectations. Children's achievement is shaped by what is expected of them. They need to know that you think they can be successful at math.

If your child complains that he's "just not good at math," help him figure out why he feels that way. The problem could be a reading problem or that he doesn't understand the math terms. Once the problem is identified, you can get help to work on it. Remind your children of all the great things they already know how to do that involve math.

In high school, students usually have choices about the number and types of math classes to take. Encourage kids to take four full years of math, and to take courses that will challenge them. Most colleges look for three to four years of high school math.

5. Math Futures: Help your child realize that math can help her reach her goals. Talk with her about all the jobs—architect, doctor, plumber, engineer, cook, etc.—that require math. Look for chances for her to meet, observe, or talk to professionals in math-related fields.

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¹ Throughout this issue of the *Bulletin*, we sometimes refer to a child as a "she" and other times as a "he." We are doing this make to make the articles easier to read, but every point we are making refers equally to male and female children.

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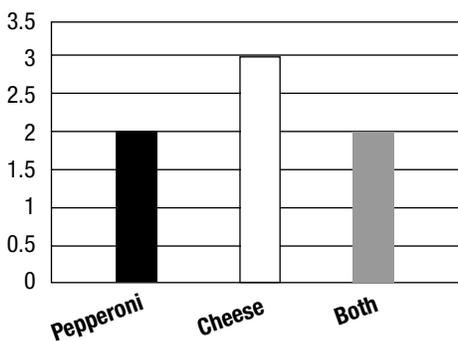
Getting Familiar with the Standards: MATH

One important way parents can help their kids learn is to know about the learning standards for key subjects. In education, “learning standards” say what knowledge or skills a student must learn. In Massachusetts, education standards are set for each grade level and for each of the key subject areas, such as English Language Arts, Science, and Mathematics. The standards for each subject area are listed and described in books called the “**Curriculum Frameworks**.” Each school plans what it teaches based on the “Curriculum Frameworks.”

For each subject, the Curriculum Framework is organized into different sections, or “strands.” The strands in the *Mathematics Curriculum Framework* are: Number Sense and Operations; Patterns, Relations, and Algebra; Geometry; Measurement; and Data Analysis, Statistics, and Probability. Each strand lists the standards for that particular area. Following is an example of a mathematics learning standard for grade 6 from the *Mathematics Curriculum Framework*. The identifier “6.P.4” means that the standard is for grade 6, is in “strand” P (Patterns, Relations and Algebra), and that it is standard number 4 in this strand.

Learning Standard 6.P.4: “Represent real situations and mathematical relationships with concrete models, tables, graphs, and rules in words and with symbols, e.g., input-output tables.”

Parents can use the Curriculum Frameworks to learn what their children should be learning in each subject. You could also use them to help your child get practice in a subject. For example, the standard above is about how to show a situation from everyday life in mathematical terms. So, let’s say your child is having 7 friends over for a pizza party. You could then suggest he use a table or graph to show how many friends want cheese pizza, how many want pepperoni, and how many want both. The results can help you decide what to order. If your son were to draw a bar graph, it might look like this:



The graph shows that two friends like pepperoni, three like cheese, and two like both.

MCAS and Math Standards: The Massachusetts Curriculum Assessment System (MCAS) tests are meant to show how well students have learned the standards—each MCAS question is linked with a particular standard. So you can also help your child practice the standards (and prepare for the MCAS tests) using past MCAS test items. MCAS test items (with an answer key) are online at www.doe.mass.edu/mcas/testitems.html, and the documents that give old test questions show which standard went with what question.

(For help getting a copy of a **Curriculum Framework**, or for copies of test questions, give Parents’ PLACE a call.)

What exactly is algebra?

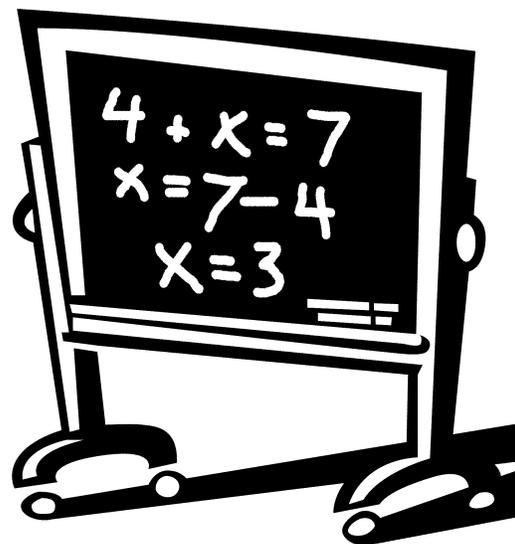
Algebra is the gateway to higher math. Algebra gives students the concepts and language they need to move from solving individual math problems to understanding general relationships. But what exactly is it?

Algebra is a form of advanced arithmetic in which letters of the alphabet represent (or stand for) unknown numbers. The letters that are often used are x, y, or n. Younger children use simple algebra when they solve a problem

such as $4 + ? = 7$. When they get older and study algebra, a letter replaces the question mark. The same problem would then look like this: $4 + x = 7$.

The letter x in this example is also called a “symbol” or a “variable.” It is a symbol because it represents something. It is a “variable” because the x can represent different numbers depending on the problem.

The problem $4 + x = 7$ is also known as an “equation.” An equation is a statement that two things, or two sets of things, are equal. “Equal” means that the items on each side of the equal sign (=) have the same value.



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6. Math at School: There are also many ways families can help improve their children's math achievement in school.

- To get an overview of what math skills your child should learn in his current grade, ask the principal for the school's math curriculum guide, sometimes called a "syllabus."
- Ask the math teacher specific questions about what skills are being taught this year, and how they are being taught.
- Find out what the teacher's expectations of students are, how grades are determined, and how successes are celebrated. Ask about specific plans for helping your child improve.
- Keep in touch with teachers. If you notice that your child seems to be struggling with a certain type of math problem, or with certain skills, let the teacher know and ask what can be done to help. Ask how you can support classroom learning at home.

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- Talk with your child about how math class is going. Check that homework is getting done, and getting done completely. If your child is having trouble with the assignments, help him figure out what the difficulty is. Then you or your child can raise this issue with the teacher.
- You can also look at sample MCAS math questions from previous years. They can give a sense of the MCAS expectations in math. The family could also practice sample math MCAS

questions together. MCAS test items in all subjects are available (in English and Spanish) online at www.doe.mass.edu/mcas/testitems.html, or call Parents' PLACE.

7. Good Teachers: A good teacher is essential. Find out if your child's math teacher is highly qualified in math. According to the *No Child Left Behind Act*, the federal education law, the school must tell you, if you ask, whether or not the teacher meets the state standards for being "highly qualified" to teach a particular subject.

8. Support Teachers' Learning: Be an advocate for professional development activities for teachers and administrators.

9. Keep at It: Even with a good teacher and interesting lessons, math can still be frustrating and challenging for many students. Expect some confusion as part of the learning process. As a parent, you can give your child encouragement, while also insisting that she keep working and not give up.

What exactly is algebra?

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Solving an algebra problem means finding the number that the symbol (or variable) stands for. So, with the above example, the question to be answered is: "What number (x) when added to 4 equals 7?" Other examples of equations are $5x = 25$ or $3y + 2 = 302$.

To solve an equation, the basic operations of mathematics are used: addition, subtraction, multiplication, and division.

The equation is solved when we end up with the variable all alone on one side of the equal sign.

For example, $4 + x = 7$.

If 4 plus (+) something unknown (the variable "x") adds up to 7, it must also be true that $x = 7 - 4$.

Therefore, 7 minus (-) 4 must give the answer. The answer is 3, or $x = 3$.

For more information on algebra, and its importance for students, call Parents' PLACE for a copy of "Families Ask: What type of algebra do students do in middle school?," *Mathematics Teaching in the Middle School*, November 2004.



Parents' PLACE Pointers is a series of fact sheets on various aspects of the *No Child Left Behind Act* (NCLB). Written in family-friendly language, **Pointers** provide essential information on NCLB so that families and professionals can easily understand how this complex educational law applies to all students in public schools throughout the Commonwealth.

The first three issues of **Pointers**, on the topics of School Report Cards, Supplemental Educational Services, and School Choice, are now available in English, Spanish and Portuguese. Visit www.pplace.org to view and download pointers, or call us toll free at (877) 471-0980 to get free copies!

Useful Resources

ERIC Digest, "Improving Student Achievement in Mathematics," Grouws, D. A. & Cebulla, K.J. (December 2000; Updated June 2003). ERIC Clearinghouse for Science Mathematics and Environmental Education. "Part 1: Research Findings" (EDO-SE-00-09) is online at <http://www.ericdigests.org/2003-1/math2.htm>. "Part 2: Recommendations for the Classroom" (EDO-SE-00-10) is online at <http://www.ericdigests.org/2003-1/math3.htm>.

These 4-page Digests summarize recent research on effective math instruction and give lots of examples for how they can be used in the classroom and at home.

Helping Children Learn Mathematics, National Research Council. (2002). Kilpatrick, J. & J. Swafford (Eds). Washington, DC: National Academy Press. Read for free or purchase for \$10 at <http://books.nap.edu/cataqlg/10434.html>.

This gem of a book sets out a course of action for what must be done if all students are to become proficient in mathematics. The book examines school mathematics during a critical period in a child's education—from pre-K



through eighth grade. While stressing the need for students to learn numbers and computation, the authors also stress the need also to give attention to algebra, geometry, probability, and statistics in the early grades. This means that math must be taught in an integrated fashion, not just teaching single skills in isolation. The book lists things that parents and caregivers can do to help their kids learn math.

Helping Your Child Learn Mathematics, U.S. Department of Education. (2002). For a free copy, call (877) 433-7827, or download it from www.ed.gov/parents/academic/help/hyc.html.

This free booklet examines what it means to reason and communicate mathematically. It demystifies the notion that math is a "hard" subject

that only a few can master. It shows examples of daily opportunities for learning math concepts in the home, at the grocery store, and on the go. It is meant for parents with children through grade 5.

Principles and Standards for School Mathematics, National Council of Teachers of Mathematics. (2000). This book can be purchased (\$52.95) or read online (using a 90-day free trial) at www.nctm.org/standards, or by calling NCTM at (800) 235-7566. The authors also permit Parents' PLACE to photocopy limited material for educational purposes. Readers interested in a specific grade level may call Parents' PLACE for a copy of that section.

This crucial 402-page book and CD has set the standards for math instruction that have been adopted by states across the country. It sets forth a vision for school math, then proceeds to explain how this vision would look in general and then in specific detail across four grade bands—pre-K to 2, 3 to 5, 6 to 8, and 9 through 12. The CD offers a searchable version of the book, along with interactive math tools.

For a copy of any of the free resources, please contact Parents' PLACE toll free at (877) 471-0980.

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