

DOCUMENT RESUME

ED 428 948

SE 062 081

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TITLE Family Involvement in Education.
INSTITUTION Eisenhower National Clearinghouse for Mathematics and Science Education, Columbus, OH.
SPONS AGENCY Eisenhower Program for Mathematics and Science Education (ED), Washington, DC.; Office of Educational Research and Improvement (ED), Washington, DC. Office of Reform Assistance and Dissemination.
REPORT NO ENC-98-006
PUB DATE 1998-00-00
NOTE 65p.
CONTRACT RJ97071001
AVAILABLE FROM Eisenhower National Clearinghouse, The Ohio State University, 1929 Kenny Road, Columbus, OH 43210-1079.
PUB TYPE Collected Works - Serials (022) -- Reference Materials - Bibliographies (131)
JOURNAL CIT ENC Focus; v5 n3 1998
EDRS PRICE MF01/PC03 Plus Postage.
DESCRIPTORS Educational Resources; Elementary Secondary Education; *Family Involvement; *Mathematics Education; *Parent Participation; Parent Role; Resource Materials; *Science Education

ABSTRACT

The Eisenhower National Clearinghouse for Mathematics and Science Education (ENC) helps teachers by offering a broad assortment of services to enable them to quickly locate educational resources. This document is designed to give educators information about curriculum resources available for teaching math and science in K-12 classrooms. Each issue of ENC Focus presents a selection from the Clearinghouse collection focused on a topic of particular interest to math and science teachers. In addition to meeting general requirements for inclusion in the ENC collection, curriculum materials listed in the Focus series are appropriate to the specific topic of the issue; support hands-on, active, inquiry-based methods of instruction; and are readily available. This issue offers a sampling of useful materials and other resources on family involvement in mathematics and science education. A one-page description of each resource provides an abstract of the contents, subjects addressed, grade level, publication date, ordering information, price, authors, and related resources. (ASK)

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For Mathematics and Science Education

Family Involvement in Education

ED 428 948



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Using ENC to learn more about family involvement in education

The Eisenhower National Clearinghouse for Mathematics and Science Education was established to help K–12 teachers locate useful teaching materials. The Clearinghouse collects all types of materials at the National Repository in Columbus, Ohio, at The Ohio State University. ENC makes information available about all of these resources in several ways. For example, this print catalog is one of a series that highlights specific topics and resources in math and science. All of ENC's resources in combination will provide comprehensive information for teachers, parents, and students on a variety of topics, including family involvement in education.

ENC Online

ENC Online has links to exemplary science and math Internet sites through the Digital Dozen, selected monthly, classroom links, and other educational resources. Some Internet sites are available with information about involving families in education. You can find them in two ways: search Resource Finder, or browse through the links on ENC Online. If you have time to browse, you will find all kinds of things you might be able to use in your classroom. ENC Online also links to some of the full-text articles featured on ENC CDs.

ENC CD-ROMs

ENC's CD-ROMs have a variety of previously published documents in electronic format about curriculum issues in math and science education, as well as resources developed by ENC to meet educators' needs. These documents cover curriculum standards and implementation, and include the complete 1989 NCTM *Curriculum and Evaluation Standards for School Mathematics*. TIMSS (Third International Math and Science Study) and Equity are the topics of the two newest ENC CDs. The content of these discs is available online; for the TIMSS materials, go to <http://timss.enc.org/>, and you can go to <http://equity.enc.org/> for the equity resources.

ENC Demonstration Sites and Access Centers

Located throughout the country are 12 Demonstration Sites that can be found at, or work in conjunction with, the 10 Eisenhower Regional Consortia, at the Capital Collection & Demonstration Site at The George Washington University in Washington, DC, and at ENC. Teachers and other educators can visit or contact the Site in their area for a complete demonstration of ENC's services as well as assistance in locating educational materials and using new technologies. ENC Access Centers spread the work of ENC and the Demonstration Sites even further. These Centers volunteer to teach local educators about ENC and to disseminate ENC's products. Often they are located at schools, universities, museums, or professional development centers. Contact your Regional Consortia to learn about Access Centers in your area. For a directory of the Consortia and Demo Sites, see page 59.

Visit ENC Online at <http://www.enc.org/> to access the online versions of ENC print publications.

**The Eisenhower National Clearinghouse for Mathematics and Science Education
is funded by the U.S. Department of Education, Office of Educational Research and Improvement.**

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Family Involvement in Education

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Past issues of *ENC Focus* include *Integrating Math and Science*, *New Approaches to Assessment in Science and Mathematics*, *Calculator-Active Materials*, *CD-ROMs and Laserdiscs for Science*, *Professional Development for Math and Science*, *Using Children's Literature in Math and Science*, *Multicultural Approaches in Math and Science*, and *Informal Mathematics and Science Education*.

While some back issues are out of print, most are available online at <http://www.enc.org/> or on CD-ROM.

About ENC Focus

This project has been funded at least in part with federal funds from the U.S. Department of Education under Contract No. RJ97071001. The contents of this publication do not necessarily reflect the views or policies of the U.S. Department of Education nor does the mention of trade name, commercial products, or organizations imply endorsement by the U.S. Government.

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To connect to ENC Online via the Internet, visit ENC's World Wide Web site (<http://www.enc.org/>). You can also telnet to guest.enc.org; via modem dial (800) 362-4448 or (614) 292-9040. Set your communication software to VT100 terminal emulation, no parity, 8 data bits, 1 stop bit, and full duplex. Once connected, press <RETURN> to bring up a screen and type c to connect. All the information you need to use ENC Online is on the screen.

ENC Reference Services

People with questions related to K-12 math or science education can call the ENC Resource Center's reference staff. Services include assistance with locating teaching materials, conducting research, and making effective use of ENC Online and Resource Finder, ENC's catalog of curriculum resources. Call the Reference Desk at (800) 621-5785 or dial (614) 292-9734. Questions can also be sent via e-mail to library@enc.org.

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Family Involvement in Education

"I see parents as the first teacher that children have, the most consistent teacher they have, and the most influential teacher they have."

Sandy Parker, fifth grade teacher

That quote states better than I could our rationale for this issue of *Focus*. Parents—and we extend the meaning to include grandparents, older brothers and sisters, all caretakers who make up the child's nurturing unit—play an indispensable role in math and science education. It is in the home that children first see themselves as explorers of science and as investigators of numbers and shapes.

But once the children are in school, isn't all that math and science the teacher's job? And how can parents, many facing their own discomfort/anxiety with these subjects, help their school-age children? The homework isn't even the same as it was when they were in school.

The homework issue brings up the need seen by both teachers and parents for a line of communication between school and home. How can that school/home connection be made and maintained?

These are questions we brought to a variety of experts on family involvement, each of whom is concerned with how parents can influence their children's learning. Staff interviewed the host of a television science show (Bill Nye the Science Guy); an author of the FAMILY MATH program (Virginia Thompson); two coordinators of a statewide science program for parents (Karen DeCoster and Janet Stein); the president-elect of the National PTA (Ginny Markell); and a veteran elementary school teacher (Sandy Parker). Kimberly Roempler, an Associate Director of ENC and a parent,

wrote an article about the importance of promoting gender equity in science experiences for children. In addition, author and math educator, Suzanne Sutton, wrote her own article in answer to our questions.

While each professional spoke from a unique perspective, some common themes appear in their answers, such as the unquestioned value of family involvement. Virginia Thompson points out that just as we expect reading to go on outside the classroom, so too mathematics needs to be taken beyond the classroom and into the family circle. To Janet Stein and Karen DeCoster, the key is engaging parents and children in science activities, turning them on to science and to their natural curiosity about nature. What follows, they hope, is new confidence, a conviction that "I can do this."

Another theme is the importance of family-school collaboration; above all, as Ginny Markell put it, the need to create mechanisms for teachers to communicate with parents. Both Sandy Parker and Virginia Thompson suggest ways for schools to open to parents, to welcome and include them in the discussion loop on such topics as class goals, homework help, and the consequences of their children's choices in taking one math course rather than another.

A third theme is actually a premise: parents do want to help their children succeed in math and science.

Often they don't know how. Encourage students not to give up, says Suzanne Sutton, but rather to accept that learning means struggle and to believe they have what it takes to learn. From another angle, Bill Nye emphasizes the fun potential in learning and the value of play: "There is just no substitute for letting people dink around, letting them dig holes in the backyard or make mud pies."

Several of these educators make the point that although parents may feel uneasy about their own ability to answer questions about math and science, what children need more than direct answers is good questioning. In fact, the answer they consider most helpful is, "Let's find out together."

In addition to these articles, we have highlighted resources that generally fit into one of two categories: building school/home connections or materials for parents and children to work on together. In the first section, **School/Home Connection**, some of the selections attempt to answer parents' and teachers' concerns about why and how to become collaborators in children's education. Examples of this type of resource are *Parents as Leaders in Science and Math*



Reform (p. 21) and *Building Parent Partnerships* (p. 23). Other materials speak directly to parents about nurturing their children's abilities. For instance, *Math Power: How to Help Your Child Love Math, Even if You Don't* (p. 25) offers strategies for teaching math concepts to children from pre-kindergarten through fifth grade, including activities and games. The section ends with general guides to the Internet and Web sites selected especially for parents.

The next sections grew out of the idea of enabling parents and children to use math and science in everyday living. With that in mind, we grouped exemplary resources under five areas of home activity. **Around the Kitchen Table** contains math games for all ages and science experiments for the kitchen. **Around the Television** offers videotapes on such topics as nutrition, positive exponents, oceans, shadows, and mysteries that require mathematical reasoning to solve. A special note on videotapes: Because of space, we could offer only samples of entire series.

Around the Computer contains our software and CD-ROM selections as well as Web sites recommended for students.

Interactive in nature, most of these resources engage children in games or investigations that require mathematical and scientific problem solving. **Around the Workbench** presents materials for assembling and disassembling, for getting hands dirty in real science. In the final section, **Around the Backyard & Beyond**, you will find activity books, Web sites, magazines, children's literature, and other resources that lead children to explore the outdoors with scientific eyes. For example, through experiments presented in *Backyard Scientist: Exploring Earthworms with Me* (p. 51), elementary school children can do hands-on investigations to learn about earthworms and what they mean to the environment.

We hope you find the articles and resources in this issue helpful. The influence of family is, without doubt, a significant power in nurturing future mathematicians and scientists. And not only is it worthwhile to open a child's eyes to the wonder of earthworms or kitchen chemistry or numbers, the potential for family fun is unlimited! ❖

Terese Herrera, Ph.D.

Searching ENC's Collection of Curriculum Resources

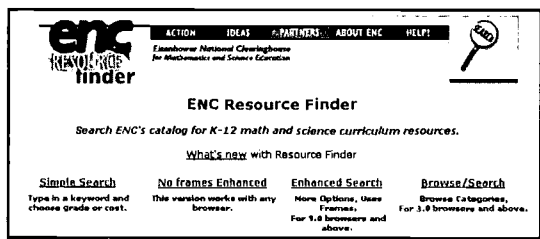
You can get to *Resource Finder*, ENC's online database of educational materials, at

<http://www.enc.org/>. Four search engines are available for use: *Simple Search*, *No Frames Enhanced*, *Enhanced Search*, and *Browse/Search*.

The *Simple Search* allows you to search using words, as well as grade level and cost. A sample *Simple Search* could include Homework AND Parents as Search Words, Grade 7, and any cost. The list of search results includes resources with both "homework" and "parents" in the catalog records.

The *No Frames Enhanced* search allows you to better limit and define your search. In addition to word search, grade level, and cost, limiters such as Resource Type, Subject, and Standards are available. Lists of ENC's controlled vocabulary are provided. For instance, Resource Type includes words such as Children's Literature, Games, Software, and World

Wide Web (WWW) resource. A sample search using *No Frames Enhanced* could have Parental Involvement (if you use



more than one subject, the terms need to be separated by a comma) as Subject; 4 as Grade; and Web as Resource Type. One of the resources in the list of results for this search is the Web site *Surfing the Net With Kids* [ENC-011880]. (See page 28.)

The *Enhanced Search*, which uses frames, features pop-up vocabulary lists. The *Browse/Search* feature allows you to browse large categories based on ENC's subject lists.

You can also search by ENC number (i.e., ENC-011880), a designation we assign to each resource to indicate where it is shelved in our repository. This number appears at the end of the abstract in *Focus*. You can search for specific records in *Resource Finder* by typing in the ENC number in the Search Words blank. For example, typing in ENC-010948 brings up the record for *Family Math for Young Children* (1997), published by Lawrence Hall of Science, University of California. (See page 20.) When contacting ENC about a particular resource, be sure to refer to the ENC number.

For each item in a list of search results, an icon lets you know what kind of resource it is (for example, videotape, kit, or Web site). Each icon is followed by descriptive text that contains its title, grade range, cost range, and the beginning of the abstract. Clicking on the title brings up the entire record, including the complete abstract, the table of contents, any evaluations, and availability information.

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Bill Nye's

ADVICE TO PARENTS

Straight Talk from America's Science Guy

The following article is based on an exclusive ENC interview with Bill Nye.

For information about his television show, Bill Nye the Science Guy, see box on pg. 7.

Suppose you went to a party and said "Well, I never learned to read, so I really don't read anything." That would be shocking, right?

Well, to me and to us in the science community, it is equally shocking to hear people say "I never learned anything about math and science—it doesn't really grab me that much." You operate your car—and you don't know how it works, and that doesn't bother you? You operate your coffee maker and you don't have any idea how it works?

You have to be math and science literate to be a person these days. Look around—everybody has a computer. There are even computers in shoes now, microprocessors to run those little blinking red lights. Your wristwatch is more accurate than any clock made up until after World War II. All those millennia of human history and they couldn't get a watch as accurate as you can get for free at a fast food place with your kid's meal.

The more scientifically literate our populace, the better everyone's quality of life will be because we will be able to make

better decisions as voters. You know, everything you can think of is a world-ending problem: we have global climate change, we have AIDS, we have drug-resistant strains of salmonella—these are all science problems. They are also political and economic problems, but they are fundamentally science problems, so we need scientifically literate people to deal with them.

There are a lot of parents who were uncomfortable with science in school and aren't comfortable with science as grown-

ups. And people say this all the time: "Kids do what their parents do." I know what you're thinking—"Hey, thanks Bill! You're a genius." Seriously, though, parents play a huge role in any educational activity. The big thing to realize is that you don't have to have all the answers.

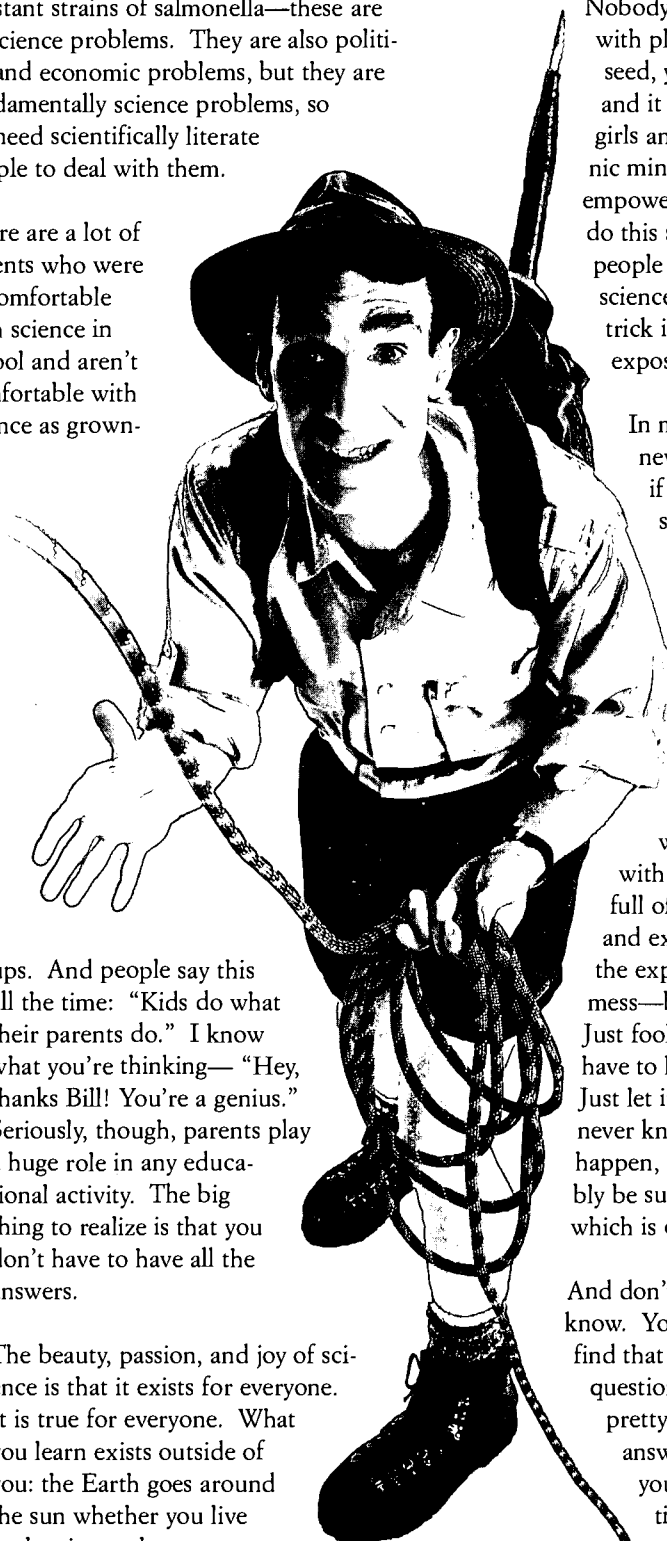
The beauty, passion, and joy of science is that it exists for everyone. It is true for everyone. What you learn exists outside of you: the Earth goes around the sun whether you live in the city or the country,

the United States, or the Middle East.

The moon goes around the Earth once a month—end of story. Who made that up? Nobody knows. Same thing with plants: you plant the seed, you put water on it, and it grows. Thus, for girls and for people of ethnic minorities, science is empowering. Anybody can do this stuff! Really, most people who are exposed to science think it's cool—the trick is just to get them exposed to it.

In my experience, you never have to ask kids if they want to try something. They always do. You just need to hang out with them while they're doing it, help out with the whole thing and then help them clean up, the same way you would do a craft with them. Get books full of demonstrations and experiments and do the experiments—make a mess—but then clean it up. Just fool around; you don't have to have the answers. Just let it happen. You never know what's going to happen, and you will probably be surprised a few times, which is charming.

And don't be afraid to not know. You'll be surprised to find that for most of the questions you will have a pretty good handle on the answer. Sometimes you'll get asked a question you can't answer—like "Why



is the grass green?" I am pretty sure you could safely say that no one knows. Maybe you'll be the one who figures that out! Now how it works—the mechanism of chlorophyll and stuff is pretty well understood, but why plants chose to be green after all these centuries of evolution is not obvious.

Everyone's probably heard of the red tide, which is a certain kind of algae, and it's a very efficient form of photosynthesis. So why aren't all plants red? That is a pretty good question.

Another good one is "Why is the sky blue?" There is a great demonstration that you can do with milk and a glass of water and a flashlight. If you put a little bit of milk in a glass of water and shine a bright flashlight into it, you will get orange and blue colors, just like a sunset.

The real question behind all of these kinds of things is, "How would you figure it out?" You would look it up. Get on the Web and look it up, or get a set of encyclopedias and look it up. Every family should have a set of encyclopedias, and every household should have an unabridged dictionary. There is so much information in a dictionary, science nouns and great pictures, that I really recommend it.

The other thing I like to tell parents is don't hover over your kids when they're doing homework. Frankly, to me the best thing is not to help them. Have an interest in it, but I wouldn't help them, in my opinion. Now, if they ask you a question—well, that's different. Then jump right in—go nuts—go wild. What I'm saying is you don't need to feel like you have to come home with a lot of prepared materials and have all the answers at your fingertips.

And don't blow off parent-teacher night. Show up! Take it seriously. The teacher is aching for you to show up and participate. If the teacher has an assignment for the class and asks parents to bring in milk cartons, you have to help out there. Think of it as an opportunity. It's all about attitude. Don't be too busy to help out. I know there are a lot of people who have very serious job obligations, but there is nothing more important than education.

Education is the key to survival. There is nothing more important, really, in the raising of your kids than education. Why does anyone become a parent? If you are an oyster, an oak tree, or a human being, what you're essentially trying to do is pass your genes on and make sure your offspring are successful. You want them to be able to compete, and education is the key. ❖

"I started doing standup comedy in 1979 after I won the Steve Martin look-alike contest," Nye reveals. He's quick to add: "Not the national one—just the local one."

Nye is not just your average Steve Martin impersonator. For the last four years, he has been the title player in the popular syndicated television program *Bill Nye the Science Guy*. He has also become an outspoken advocate for improved science literacy in the nation. In his own words, he has graduated from being a stand-up comic to a "stand-up scientist." His show combines humor, flashy graphics, and catchy "Sounds of Science" to interest children—primarily 10-year-olds—in science.

To capture the attention of his young audience, Nye makes sure his show is fast-paced and entertaining without watering down the real science content. The shows alternate between planetary science (Earth science and astronomy), life science (biology), and

physical science (physics and chemistry). Episodes that deal with life sciences often deal with the human body, because of the tremendous fascination children have with their own bodies.

The show's philosophy is to keep the vocabulary simple and straightforward and to only focus on two or three learning objectives. Sample learning objectives from a show on dinosaurs might be that fossilized bones prove the existence of dinosaurs and that dinosaurs and humans did not live at the same time. The episodes cover additional information, such as techniques used to determine the age of the fossils and the approximate timeline of dinosaurs versus humans, but essentially the goal is to communicate and reinforce a few fundamental science concepts.

"We conduct focus group research to test how well people have retained the learning objectives, and the retention is often over 90 percent," Nye notes. "The real test, however, is that it's still 90 percent months after seeing the show."

Not only does the show concentrate on keeping the science straightforward, it also works diligently to make sure it gives equal representation to both genders and people of color. "It's unfortunate that we're starting with the dorkiest white guy going," he admits, but adds that he has been surprised to see just how well his viewers have responded to seeing girls and students of different ethnicities on his show.

Nye's show has enjoyed enormous success, winning a number of daytime Emmy awards and other recognition. It is watched by thousands of children across the nation, carried by public television stations as well as commercial networks. And Nye shows no signs of slowing down: when asked why he does what he does, he responds, "I'm trying to change the world. That's my little goal."

**Behind
the
Scenes
with
Bill
Nye**

Beyond Homework Help: Guiding Our Children to Lasting Math Success

Suzanne Sutton, Math Educator and Lecturer



As Kevin passes through the kitchen, his mother ventures a cautious, "Did you do your homework?" Kevin grunts. Unsure whether this is a yes or a no, anxious over his slipping math performance, and unable to do the math herself, she hesitates, surveying her options. Does she threaten, cajole, hire a tutor, or pray? With her ability to help with homework long passed, her options seem limited.

After his next test, she calls me. "I'm worried. My son is sinking in math, and I can't help him. Even if I understood it, which I don't, he won't listen to me. Is there anything I can do?"



Suzanne Sutton

*Suzanne Sutton is a math educator and lecturer offering workshops for parents, teachers and students on math learning. She has recently completed a book for parents, *Through Newton's Window: Guiding Your Children to Math Success*. She hosts *Newton's Window: Online*, a resource for math learning, at <http://www.suzannesutton.com>. Readers can continue the dialog at suzanne224@aol.com.*

This mother's lament is a common one, and her concern is justified. Our nation is reeling from recent reports of the poor performance of American students in mathematics. These latest results dispelled any doubts and showed us the depth of the problem. TIMSS (Third International Mathematics and Science Study) was massive and thorough; the largest and most comprehensive study of its kind ever undertaken, TIMSS compared students from 41 countries, in depth. More than a mere test of performance, it looked closely at many facets of learning and many issues surrounding instruction, teacher training, and student lifestyle, as well as a detailed look at understanding. The results were released over a

two-year period, comparing students in fourth, eighth, and twelfth grades. They are very disturbing. (To see the results, visit <http://timss.enc.org/>).

The message is clear: American students are not learning math as well as students in almost every other country. Parents and educators are understandably concerned, believing with certainty that the absence of math competency will handicap our young people as they attempt to make their way in a complex and competitive world.

But read on. Yes, the picture TIMSS illustrates is accurate and disturbing. But the answer to Kevin's mother is also yes: there is much families can do to develop strong mathematical learning, competencies, and attitudes within our children. And the news is even better: parents do not need to know or even like math to do it.

Dispelling a Disabling Myth

Mathematics is a glorious and troubling subject. Some love it, more

hate it, but all of us, whichever camp we fall in, are humbled by it. "Don't fret over your troubles in mathematics," Albert Einstein said, "I assure you, mine are still greater."

Parents of young children begin mathematics with great enthusiasm, helping them discover numbers and shapes in all corners of their world. Resources are plentiful: books and games and toys and software that promise to turn math into pleasure and get children started into a world of math success. Parents' unease over their own abilities in math are kept at bay while their children are young, and they can understand the math their children are doing. But sooner or later—and these days it is much sooner—their children encounter mathematics that their parents don't understand. The anxieties begin to build.

Students' math anxiety begins with a faulty premise: "They get it, but I don't, and the struggle is evidence that I don't belong, evidence that I'm not mathemati-

cally inclined." The premise is wrong. Math is a struggle for everyone. The struggle is evidence that we're in the "good stuff."

Ultimately, math comes easily to no one. But it seems to. We all know others who don't seem to struggle, who just "get it." Certainly, apti-

undermines students to whom the struggle comes early. They are convinced their brains are flawed, convinced they don't belong in math. They don't join the struggle with enthusiasm; they feel as if they're hanging by a thread. Their anxiety limits their understanding and their choices.

teach our children the math, we can teach them how to struggle.

A New Role for Parents

Most parents assume that helping means homework help—explaining procedures or concepts. Their ability to do this lasts only a short time. With changing curricula, different kinds of assignments and more difficult mathematics, many parents feel at a loss to do more than ask if

While we cannot teach our children the math, we can teach them how to struggle.

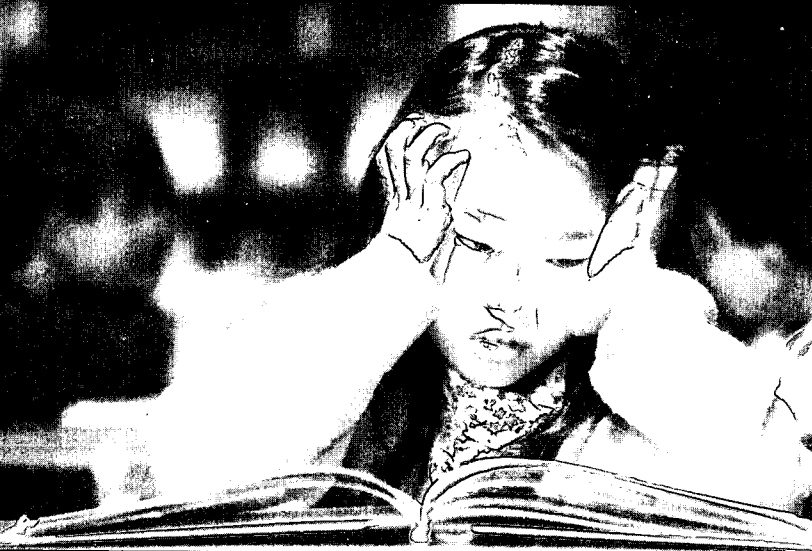


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They hate every minute, and they flee too soon.

But the high-performing, quick, and intuitive student suffers from this myth as well. Believing that math success is a function of aptitude, she doesn't learn how to struggle; in fact, she's proud that she doesn't seem to need to. She doesn't learn how to dig, how to probe for understanding. Sailing through, she doesn't reinforce the foundation. When the content gets more difficult, she misinterprets her confusion, and figures, wrongly, that she's not as good at it as she thought.

One of the most significant things parents can do is to help their children understand the normalcy and the value of struggle in mathematics. While we cannot

the homework's been done, and monitor tests and grades. But parents can play a far more valuable role, for they are in the best position to influence their children's math success. Long-term math success is not determined by a good teacher, or a revamped curriculum, or mathematical prowess in the parent—or the child. Learning math ultimately comes down to one thing: the ability, and choice, to put one's brain around a problem—to stare past the confusion, and struggle forward rather than flee.

For all of us, learning math involves struggling. When we help our children see this, and guide and encourage them along the way, we'll be teaching the most fundamental piece in the vast and controversial picture: how to learn.

One week, several years ago, I received phone

tudes vary; some concepts come more easily than others, and at varying speeds. But don't be fooled. Eventually every student reaches a point where she doesn't understand, and what she does at that point will determine her success—not any innate aptitude or brilliance.

This belief in mathematical inclination and disinclination undermines all students. Clearly, it

calls from the mothers of two girls, at two different schools, in very similar situations. Both girls were struggling in geometry, each had mild learning disabilities, and each brought a warmth and energy to our sessions. I began working with both girls, and each one progressed. But while both of them brought similar aptitudes and difficulties to the subject, and each one was affable and engaged in our sessions, they differed sharply in attitude and approach. Anna retreated from the difficulties, relying on the teacher's performance or my explanations. She merely went through the motions, never pushing past her own confusion. Bridget, however, expected it to be difficult and struggled with it—genuinely struggled. She did not wait to be led to the answer; she entered it without me, brought her confusion to me, stuck with it again and again, and continued to work at understanding between our sessions.

It was more difficult for her than for any student I have ever taught, and yet when she left for her final exam I observed that of all my students in that subject, most with aptitudes far greater than hers, she knew it best of all. When she graduated this year, she had successfully completed one of the most difficult math courses offered in high school—with little innate mathematical ability and processing difficulties that made it even more of a challenge. Yet she came equipped with the most important attribute: an acceptance of the difficulty, and a quiet inner commitment to take it on.

How Can We Help?

Bridget's parents did not help her with her math—could not help her with it, in fact. Few parents can. But in the messages they sent, the responsibility they encouraged, the support they offered, and the absence of excuses, they created a learner.

We can do the same. And parents can unclench their teeth, for math success does not rely on aptitude or luck or our ability to explain it to them, but on things we can do in the normal course of raising our children.

• Accept the Struggle.

Too often in math, parents send a message that the struggle is a

sign of a problem. We accept struggle in sport—when a young athlete practices lay-ups for hours, or drops a sweat-soaked jersey in the washer after a hard game—our response is usually pride, and “good job.” But we seldom respond similarly to struggle in mathematics. “I was never very good at math either,” we might say, observing our child encounter difficulties. Even the way we ask about the homework can imply an expectation that it will, or should, be easy. Instead, we can ask—conversationally rather than authoritatively—how they're doing it, what they're struggling with, and offer suggestions of how to master it.

• Encourage Mastery.

The students who succeed in high school have mastered the material that came before. There is no escaping this. Many of the students who sit at my table were the elementary school stars to whom it came easily—for a while. They sailed through the material in the early grades, able to remember and reproduce procedures, but never really mastering them. The 10-year-old practicing lay-ups knows a fundamental fact: it's not enough to be able to do one good lay-up now and then. To be in the game, mastery requires more. We pass this truth onto our children easily in sport; we can do the same in



math. Encourage mastery, not as a chore or punishment, but with the same pride and enthusiasm we encourage mastery in sport.

• **Look Beyond the Grade.**

Grades in mathematics can be deceptive. Usually they are simply a percentage of right answers; often they don't accurately reflect understanding. Many of my students received plenty of A's and B's and were unaware of their weak foundation.

Teachers give frequent tests to enable them to compile a composite grade at the end of the term. Many "A students" are very good at remembering procedures long enough for the test, but are unable to make the connections with the material that will be required as they advance. Their high grades deceive them into thinking their learning is deep. Similarly, many of my students who are well on their way to deeper understanding score low at the time of the test, but their understanding is solid later in the term. Focusing only on a student's grades can give an incomplete picture and lead to unnecessary discouragement or complacency.

• **Fundamentals Are Fundamental.**

There is much controversy these days over teaching the "basics," but parents can avoid

the controversy and simply encourage and assist in mastery of the fundamentals. The more solid this learning is, the more successful the student will be. The arithmetic facts, mastery of the operations, a solid and ready ability to manipulate fractions—these are not mere elementary school units to pass through, but essential components of work done in each course in high school. Bridget was one of the few students I have worked with who did not need to reach for a calculator to do the simple arithmetic involved again and again in complex problems. Unlike most students, she also was readily able to work with fractions and factoring, essential parts of higher mathematics.

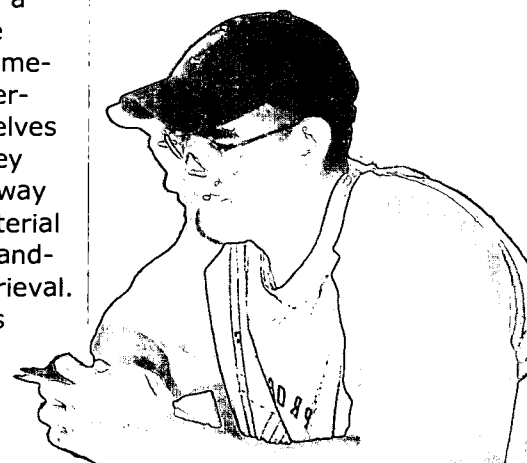
• **Discover the Textbook.**

Math textbooks are gold mines. Though few students use them as more than a repository of homework problems, textbooks offer much more. The text surrounding the problems connects the material and offers students a chance to place the information in a framework they can understand. Like the shelves on a book shelf, they give the student a way to organize the material for greater understanding and greater retrieval. But reading math is difficult. Encourage your children to look to

the text for explanations of what they don't understand. You can do this with them; as you struggle with a problem or a question, read the text with them, ponder it, and try examples. "If you can teach your children to read mathematics," a professor once observed, "we can teach them mathematics."

• **Enjoy the Journey.**

When we accept the struggle as a good and normal part of learning math, we can change the way we talk about it, the way we feel about it, and the way we learn it. Parents are understandably concerned about their children's math performance. But this concern need not be transmitted through tension, anxiety, or frustration. When parents see that the struggle is normal and valued, they can encourage—comfortably and even joyfully—the skills and attitudes that can enable their children to discover its glories and their own competence in it. Success will follow. ♦



The Massachusetts Parent Involvement Project

Julia Harris, ENC Publishing Group

"Many of today's parents grew up doing mathematics and science in isolation. Their learning experience was made up of sitting quietly in neat rows facing the teacher at the chalkboard or their textbook day after day. One goal of our project is to give parents a chance to do math and science with their children in a cooperative way. When this happens well, parents get excited and discover many things about math, science, and technology—as well as about their children and themselves."

Karen DeCoster, Statewide Parent Coordinator of the Massachusetts Parent Involvement Project

Fostering this excitement and thereby making education, particularly mathematics and science education, a priority with parents are among the goals of the Massachusetts Parent Involvement Project (PIP), a five-year project funded by the National Science Foundation and the state department of education. Just completing its first year, the project works to involve school districts, parents, and community members in supporting student success in science, mathematics, and technology education.

One central parent engagement strategy is to take hands-on activities out into community settings where parents can

be found with children in tow. The activities are being developed by the Museum Institute for Teaching Science (MITS) in Boston, a nonprofit organization that promotes the teaching of science, math, and technology in a hands-on inquiry method. (See box for sample activities.)

PIP builds on the work done through Massachusetts' State Systemic Initiative, PALMS (Partnerships Advancing the Learning of Mathematics and Science), by supporting the development of local-level coalitions of parents, school staff, and community members to develop outreach plans and activities for parents to do with their children. According to Janet Stein, the Parent Project Coord-

inator at MITS, the ideal PIP coalition includes at least two parents, a museum and library partner, a community and business partner, and representatives from the district's PALMS leadership. The project has identified three parent groups it wants to reach: parents who are traditionally uninvolved or underinvolved; parents who are already in leadership positions on PTAs, PTOs, or school councils; and parents who have a vested interest in math and science but may not know how to become involved in a community leadership role. Examples of this latter group, DeCoster suggests, might be scientists, engineers, or math/science educators who have knowledge, expertise, and interest in science, math, and technology education.

Training for Success

Over the course of its five-year grant, PIP plans to reach more than 20,000 parents. Joel Nitzberg, PIP director, explains, "We are still in the early stages. This year we have 11 coalitions in place. Next year we will be bringing on board 10 more, and hope to increase that number until there are 145 districts in the project by the end of the fifth year."

During its first year, PIP worked to help districts establish coalitions, build team skills, and field test the hands-on activities. Four training sessions were held to answer such fundamental questions as "How can we build a coalition?"; "How can schools reach more parents?"; and

Parents and teachers are both interested in the well-being of their children—they just have very different roles.

"How do we engage the community in support of science, mathematics, and technology training?"

One of the biggest challenges revealed during the first training session, DeCoster notes, is bringing school and community together as educational partners. "Education has been seen exclusively as the schools' business for so long that it can be a little unsettling for parents and educators to envision it as a shared enterprise," she says.

Stein agrees: "We're trying to develop the understanding that schools don't have to do it on their own, that there are real partners out in the community who could be helpful." She points out that parents and teachers are both interested in the well-being of their children—they just have very different roles. Parents can help teachers do their job more

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effectively by communicating about their children's interests, learning styles, and unique personalities. Teachers, in turn, can help empower parents by conveying to them how important they are in their children's learning.

At the second training session, the focus was on defining what constitutes high quality math and science. The critical role that parents play in children's education was again emphasized.

At the third session, PIP staff helped the coalitions identify a particular group of parents they wanted to reach and begin to gather baseline data about that population so that expectations and benchmarks could be set. "For example, a district in Springfield wanted to target parents of middle school girls. They saw that the enrollment of girls at the science and technology school was low, so they decided their goal would be to increase the number of girls who enrolled at that school," DeCoster explains. "Then they realized that if they were going to be working with sixth grade girls, they were going to have to wait three years to see any change in high school enrollment patterns."

Other schools mindful of the need to measure outcomes chose to track the completion of math homework, setting goals of increased completion over time; increased participation in math or science events was also identified as a possible outcome of greater parental involvement.

At the fourth and final training session, PIP staff showcased some of the hands-on activities

that have been developed. The session gave people the chance to interact with the activities and experience the math and science for themselves. In one of the activities, participants rolled cans down a wooden ramp, exploring how the incline of the slope affected the distance the can traveled. Stein was pleased by the response she noticed from the coalition members: "I heard people say, 'The next time we have a rainy day, I could do this with my kids.'" She adds, laughing, "It was a great activity, except all that stuff weighs a lot when you bring enough for 100 people!"

Everyone Is a Scientist

MITS is working on seven different kits with activities that focus on topics such as lenses and magnifiers, surface tension, and musical instruments. The activities are designed to get parents to develop confidence in asking questions and exploring science concepts with their children.

DeCoster notes, "The goal is not to fill parents with some new knowledge about math and science; it's to encourage them to do math and science with their kids back at home. By stimulating parent interest in inquiry and exploration, PIP can begin to erode some of the math and science phobias that many parents have and can inadvertently pass along to their children. It's also about helping parents understand standards-based education and encouraging them to show an interest and promote student aspirations."

When parents see themselves as being successful at the kinds of activities the project introduces, they feel empowered and begin to realize that they are capable of doing more than they might have

thought. Stein explains, "We want the facilitator of the activity to stay in the background so the interaction is really between the parent and the child. We want people to walk away saying 'I did that' as opposed to 'That person taught my child something.'" In addition, parents with an interest in math/science find that there are several ways to get involved and become a leader in their child's school or district. As one example, they may choose to participate on a PALMS leadership team helping to review curriculum or develop an after-school enrichment program.

One way to give parents the freedom to explore and experiment with their children is to take the activities into informal settings. Stepping outside of school boundaries, Stein notes, helps parents understand that the kinds of things they can do with their kids are not necessarily things that have to happen in schools. The idea is to get to the parents where they are, whether that is standing in line at the grocery store, sitting in a clinic waiting room, or browsing through the community library on a Saturday afternoon.

Making learning a valuable part of everyday life, DeCoster and Stein both agree, is what the Massachusetts Parent Involvement Project is all about. "In today's world, the pace of science and technology calls for kids to do more and think more critically, and those skills are honed in math and science," DeCoster says. "Our project hopes to change people's attitudes and help us produce a group of kids who see themselves as problem solvers and mathematical thinkers." ❖

In "Hanger Chimes," participants attach string to the ends of a wire hanger, suspending it upside-down, and then tie the ends of the string to their middle fingers and place their fingers lightly in their ears. When they bang the hanger, the vibration travels to their ears through the string. "Once people hear the sound, they start thinking about what would happen if they changed the kind of string, or the length of the string, or used plastic hangers instead of wire ones," Stein observes. "Some observations can lead to pretty intuitive answers about how vibration is necessary for sound. The

question I ask them is, how is doing something like this something a scientist might do?"

In "Shake, Rattle, and Roll," participants determine an unknown object that has been sealed into metal cans. By shaking the can and asking a series of questions, participants try to ascertain the contents. They have the opportunity to place sample objects into an open can and experiment with shaking it to compare the sound and feel with the mystery object in the sealed can.



**Sample
Activities
Developed
by MITS**

The Changing Role of Parental Involvement

Julia Harris, ENC Publishing Group



Ginny Markell

Nineteen years ago, Ginny Markell sent her oldest son off to kindergarten. She probably experienced some pangs of sadness at letting him go, along with the other anxieties many parents feel on their child's first day of school: Will my child make friends? Will he do well in school? One of the questions she asked that day, however, is one that she has spent the rest of her life answering: How can I as a parent help my child succeed in school?

As President-Elect of the National PTA, Markell is uniquely qualified to offer guidance to the millions of American parents who are working to ensure their children's educational success. Not only is she the parent of two sons, but she also has been teaching high school health science at the North Clackamas School District near Portland, Oregon, since 1985, and has been active in the National PTA long before that. During her years with the organization, she has seen a number of changes in the roles and expectations of parents in education.

One of the biggest changes she has noted is the rise of two-income families. "With both parents in the work force, it is not realistic to think that they are going to have hours and hours to give." To accommodate the demands on parents' schedules, she suggests that teachers and PTAs find short-term projects for parents to do, such as being an initial reader of a curriculum or staffing the concession stand at a high school football game.

Some of the most important contributions parents can make are even more simple: turning off the television and instituting a regular quiet or study time, and making sure their children have a place at home where they can study, do homework, or just read. Kids need to have a desk or a table where they can do their work, as well

as writing materials and access to dictionaries and other reference materials. Such things might seem too obvious to mention, but Markell is amazed at the number of homes she has seen where students don't have that kind of environment available at the close of a school day. "It would be like us coming in to work in the mornings and not having a desk or a computer," she laughs.

Expanding the Boundaries

An area of growth that Markell finds particularly encouraging is in the involvement of people other than the parents themselves. The education process is now being seen as a partnership not only between parents and teachers, but also including the community. In many school districts across the country, senior citizens have started helping in classrooms and school media centers, even acting as reading tutors. Many businesses are now letting parents have flex time so they can sit in on their child's class, give career presentations, or have their child shadow them at work. Some businesses in Markell's area have even instituted a family resource center where parents can do research or discuss issues with other parents over their lunch breaks.

Along these same lines, the National PTA has established a network of Family Information and Resource Centers that are located in schools, community centers, even churches. The services these centers offer vary depending upon the needs of the community; those that are located in preschools can have resources on parenting or interactive toys that parents can check out, while those in community centers or high schools may offer resources on career planning, drug and alcohol awareness, or college preparation. There are now approximately 13,000 of these centers across the country, with more planned.

Markell attributes the popularity of these programs and others like it to the growing sense of urgency felt around the nation for a return to family values. When this urgency was articulated by such visible figures as Colin Powell and President Clinton, people began to mobilize. "We began hearing from virtually everyone about a decrease in family values; we saw the crime rates go up, the teen pregnancies, and we began to realize that we were losing the next generation," Markell says. "And it seemed



Michael Scharnow, The Times of Fountain Hills

that one solution to a very systemic problem was just to connect kids with adults.”

Research does show that students perform better in school if parents and other caring community members are involved. Students feel a sense of pride at being able to show their parents where they work and the kinds of things they are doing. It might seem that such a desire to impress parents wears off after elementary school, but Markell urges parents to remain involved through middle and high school. The level of interaction can be as nonthreatening as going to ball games or choir concerts, to picking up the child after school and encouraging him or her to bring home friends. And even in secondary school, parent participation in classrooms can make a significant difference: the larger class sizes make it harder for teachers to give students the sort of individualized attention that makes them feel unique, so the presence of another adult can help students feel connected.

An Open-Door Policy

Markell has seen an increasing willingness on the part of school administrators to welcome parents and other volunteers into the school buildings. “We used to see signs at schools saying ‘All visitors must report to the office,’” Markell muses. “Now, I see more signs that say ‘Welcome to our school. If you are visiting please go to the office to check in.’ It’s subtle, but it’s definitely a more welcoming tone.” Administrators have begun to realize the importance of sharing and receiving news of student successes, of inviting people into the school building so they can see the good things that are going on there.

In her own classes, where parents are always welcome—even without advance warning—Markell observes how her students enjoy sharing their knowledge with another adult. “Because of what I teach and the amount of medical terminology that we use on a regular basis, the students can say things that the average parent doesn’t know,” she explains. “It is a great self-esteem builder for them. They don’t do it to show off—they just suddenly realize how much they know.”

Students can also feel proud to realize how much their parents know. Markell recommends that teachers invite parents to give presentations about careers and what employers are looking for in new hires. Such a level of involvement can help students answer those perennial, troubling questions of “Why do I have to know this?” or



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“When am I ever going to use this stuff?” As Markell explains with a rueful laugh, “Parents work in the real world; teachers work in schools. That’s how students see it.” Bringing a parent into the classroom can help bridge that perceived gap between the esoteric and the exciting. And for parents, coming into the classroom gives

them firsthand knowledge of what is happening with their children.

Markell cites an example from her own experience: a parent who was an obstetrical nurse came into class to do a presentation during their OB unit. Before standing up in front of the kids, this mother had worked with her daughter on the kinds of things it was “cool” to say and expressions she should avoid. Her daughter also told her what to expect and what kinds of questions she might receive. “This student had set her mother up to be very successful,” Markell notes. “And you know, she just beamed the whole time her mother was presenting. Her mother knew things that other parents didn’t, and the class was just in awe. Now that’s a positive connection for a parent and child to have!”

Because of the vital role that parental involvement plays in raising student achievement, the National PTA developed a set of National Standards for Parent/Family Involvement Programs. These six standards were created, in part, to promote family involvement in schools and to provide guidance for schools as to how to do that. The standards address the importance of open, regular communication between home and school, the promotion and support of parenting skills by schools, and the integral role that parents play in helping their children learn. The standards also stipulate that parents are welcome and encouraged to volunteer their time in schools, that they should be involved as full partners in decision making that affects their children, and that collaborations with the community are essential to strengthen the learning of parents, families, and schools. (See <http://www.pta.org/programs/invstand.htm> for more complete information on these standards.)

“The most important thing to realize, I think, is that when parents and teachers and community can work together, we are going to see a real change in what is going on in public schools,” Markell asserts. “People need to realize that whether or not they have kids in school, we all have a stake in how well our students are doing in school.” ❖

Giving Our Daughters Every Opportunity

Kimberly S. Roempler, Associate Director, ENC Instructional Resources

My daughter, Kelly, got a purple five-speed trail bike for her seventh birthday. When we got home one day, the bike had a flat tire. I told her to get the toolbox and take off the tire so we could take it to the bike shop. She looked at me and with her eyes wide, said "Can I?"

My heart sank when she said that. I had always tried to assure her that she could do absolutely anything. Maybe I had inadvertently given her the idea that she couldn't do that kind of task, or maybe it was just part of her environment—the toys I and others had given her or maybe the way I had played with her—even though I had tried to be aware of what I was doing.

The research in this area—gender equity—is immense. It shows that parents not only buy different toys for their sons and daughters, but they also play with their children differently. When playing with objects, girls use them to explore emotions and relationships. They rarely take them apart or try to figure out the relationship between them. Most boys, on the other hand, find the relationship of one object to another, take things apart and fit them back together, and manipulate objects in space. These skills are a major part of activities such as constructing model cars and planes, repairing bicycles, and constructing with Legos and K'NEX kits.

In terms of science and math, girls get very little practice or exposure to concepts in these fields. The toys they play with, the tools they use, the stories they read, the types of encouragement they receive—all affect girls' perceptions about, familiarity with, and confidence in their ability to do math and science. By manipulating objects, taking things apart, and putting them back together, girls can develop skills such as recognizing shapes and their relationships to each other; imagining what objects would look like rotated or sliced through the middle; identifying planes of symmetry; and making and interpreting models—skills that increase their familiarity with and achievement in math and science and decrease their anxieties about the subjects.

In high school, a fair share of girls take biology, but when compared with boys, fewer girls (even highly talented ones) take chemistry, physics, or advanced math (Kober, 1993). National exams indicate that females have significantly less science experiences than boys of comparable ages. This disparity in use of scientific equipment (scales, telescopes, and compasses) and work with experimental materials (magnets, electricity) is at least partially due to sex-role stereotyping of toys and extracurricular activities for boys and girls in our society (Rosser, 1993).

Leveling the Playing Field

Once girls are encouraged to move beyond their initial resistance, many find science fascinating. For that to happen, girls need more opportunities and more adult support in exploring science, technology, and mathematics (Marriott, 1991). A study by Girls, Inc. says girls need to be urged to take reasonable risks before adults rush to help them, and that girls need to make mistakes and get dirty—as boys tend to do—to master the kind of problem solving science demands.

Girls need motors, magnets, and model kits; they need to be asked to take the wheels off their bicycles. Providing opportunities for girls to explore roles, experiences, and activities that are generally reserved for boys allows them the opportunity to become anything they want. Girls may not ask for the opportunity to hold a snake, learn carpentry, or construct an electrical circuit, but they participate eagerly when given the chance to do so. As a parent or teacher, refuse to accept "I won't" or "I can't" in place of "I don't know how." Instead, help girls develop the skills and confidence to say, "I'll try" (Girls, Inc., 1992).

Since the bicycle incident, I have been to garage sales and bought a hand-held vacuum cleaner, toaster, and anything else that looks like it can be taken apart and put back together. Kelly and I have learned a great deal by doing just that. I also know that her confidence in doing these kinds of tasks has improved tremendously. I want my daughter to be successful in math and science all the way through her public school education so that she will have the opportunity to choose a career affiliated with these fields. I don't know how everything will play out—a few years ago, she wanted to be a princess—but I do want her to be in the position to become an astronaut on the space shuttle or a mechanical engineer if that is her choice. ❖

References

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- Kober, N. (1993). What special problems do girls face in science? What can schools and teachers do? In *EDTALK: What we know about science teaching and learning?* (pp 26–28). Washington, DC: Council for Educational Development and Research. (Online version available at <http://equity.enc.org/equity/eqtyres/erg/111315/1315.html>)
- Marriott, M. (August 21, 1991). Beyond Yuck for girls in science. New York, NY: New York Times.
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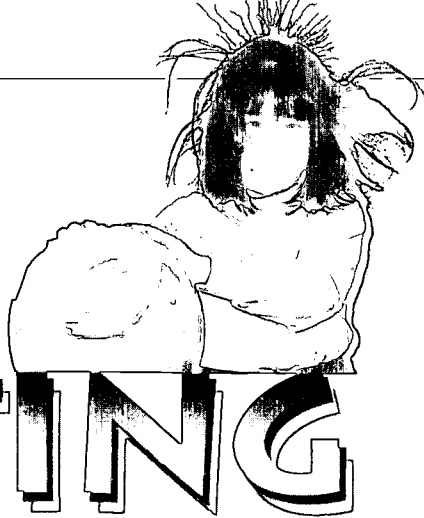
INVOLVING FAMILIES

BY

EXCITING

KIDS

Tracy Crow, ENC Publishing Group



Sandy Parker has learned that if children are enthusiastic about what they are learning, then parents are going to be enthusiastic too. Parker has been teaching for 17 years and recently won the Presidential Award for Excellence in Mathematics and Science Teaching. She teaches fifth grade at Flint Hill School in Oakton, Virginia, and has made family involvement a high priority in her work with students.

Parker has found that parents respond very well to new ways of teaching and learning in math and science if their kids are excited and demonstrating that they are gaining math and science skills. When Parker teaches students a new way of doing something—for example, she has taught them a new multiplication algorithm—the students will go home and teach the new method to their parents. Not only does this involve families in what the kids are learning, but it also reinforces to the students what they have learned.

“I see parents as the first teachers children have, the most consistent teachers they have, and the most influential teachers they have,” Parker asserts. The messages kids get from their parents about math and science education are always with them and influence what they want to learn. Thus, it is essential for parents to support their children’s learning. If parents are watching what their kids are doing for school, they can spot problems right away and let teachers know where their children are struggling. Familial support also gives students the motivation and confidence to achieve at high levels.

Parents can also model for their children how to become investigative problem

solvers. First, says Parker, parents should realize they don’t have to be the expert in everything their children ask them about. “It’s okay to say to your kids that you don’t know how to do something, but that you are willing to sit down with them and help figure it out.” That may mean talking to the teacher about what she or he is teaching in class, taking a trip to the library, or calling up a friend who knows more about the subject. Once parents take on the attitude that they are learning along with their children, any fears or long-held anxieties about how poorly they did in math or science are no longer a barrier.

BUILDING RELATIONSHIPS THROUGH COMMUNICATION

“I have found that the more communication there is, the more comfortable parents are and the more comfortable kids are,” says Parker. One way she communicates with parents and encourages parent/child interaction is through a daily assignment notebook that parents must sign. Parents often write in questions about assignments or how their child is doing in a particular area. Parker will talk about the parent’s question with the child; she then writes to the parents and tells them to discuss their question with the child. Usually the child can both answer the question for the parent and

demonstrate his or her understanding of what is going on in school.

Another tool she uses to keep parents apprised of classroom events is a weekly newsletter. Some of the things she includes are key words that parents can ask their children about to help them prepare for their weekly math quiz. She believes that if parents know what to ask their children, they will hear details about what is going on in school. At the same time, children are learning that they can talk to their parents about their education and ask them questions.

Special events like family math or science night or an invention convention are an additional avenue for family/school interaction. Parker says invention conventions interest children in science and involve parents in what their kids are doing. They are also designed to get parents comfortable with what she is doing in the classroom and help them understand what children are experiencing. “These events are totally children-oriented,” she explains. “The kids are showing off what they have done and demonstrating something that they have learned, so that they are teaching their parents. It is always amazing to the parents and very impressive to siblings.”

One way to really understand what is going on in the school, Parker suggests, is to volunteer regularly. For parents whose work schedules permit, volunteering makes them a real presence in the classroom and in the teacher’s mind. It is also a great help to the teachers: Parker has had her volunteers do everything from working on math problems one-on-one with students to helping children publish books they have written.

In whatever way parents choose to be involved, they will have a positive impact on what happens in the classroom. Parker says that such involvement “always increases the kids’ participation and understanding of what they are doing because they feel more comfortable and because their parents are more comfortable with what they are doing.” ♦

Creating True Collaborations

Julia Harris and LaTida Lester, ENC Publishing Group

Virginia Thompson, founder and director of FAMILY MATH at the University of California, Berkeley, offers a staggering observation: "I would say that 80 to 90 percent of us have had disabling mathematics experiences," she says. With such an overwhelmingly negative attitude toward mathematics, is it any wonder that parents or caregivers often—however unwittingly—communicate to their children a sense of frustration with math? While they may realize the necessity of mathematics credentials in today's marketplace, it is difficult to see past the filter of their own experience. As a result, students must negotiate a disabling incongruity: mathematics is so difficult that even their parents cringe at the thought, yet it is essential to their future and so they must find some way to surmount their difficulties and succeed.



Virginia Thompson

"The single most important thing we can do to enact reform is change negative messages about mathematics," Thompson asserts. "Children need to practice, think about, and do mathematics outside the classroom to really learn and understand mathematics concepts, ideas, and applications." An analogy Thompson uses to drive this point home is reading: if the only exposure to books and reading a child received was in the classroom, how would he or she ever come to comprehend and appreciate literature? Just as reading is an activity that transcends classroom barriers, so too is mathematics. The dining room table and the desk in the bedroom are crucial sites where perceptions are changed and reinforced. Because of this, it is essential that families be empowered to extend mathematics learning into the world beyond the school building.

Bring Home the Math

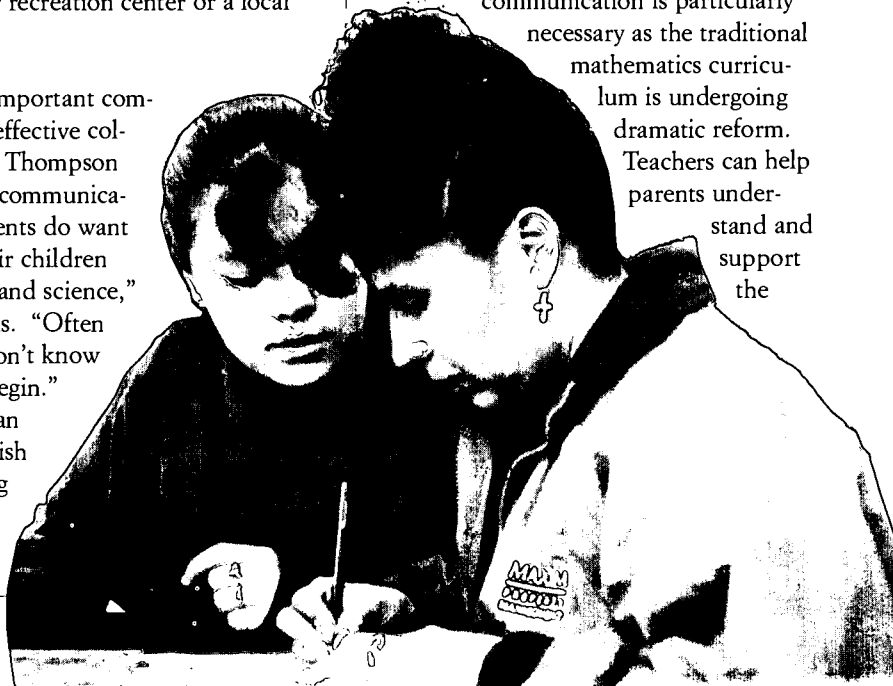
Administrators and teachers need to collaborate with parents, becoming partners with them in the work of bridging the gap between home and school. School administrators can lay the foundation for effective collaboration by developing ways to make parents more welcome in the

schools. Mathematics workshops could be offered during those times when parents are already at the school building, such as during PTA meetings or open houses. To increase attendance at other meetings, Thompson suggests that organizers provide food so that parents don't have to stop at home. She recommends offering programs that appeal to parents, on topics such as "How to help your child with homework" or "What you can do to make sure your child is ready for algebra." Other ways to draw parents in might be to hold meetings away from the school grounds, in environments such as a community recreation center or a local library.

The most important component of effective collaboration, Thompson stresses, is communication. "Parents do want to help their children with math and science," she reminds. "Often they just don't know where to begin." Teachers can help establish open dialog between

home and school by making sure that parents understand the assignments their children are being asked to do and why. They can tell parents what the goals are for the class, what the school's homework policy is, and what kinds of books or activities the parents can use to help their child at home.

By the same token, parents need to be willing to ask teachers for written suggestions and sample homework assignments; when they don't understand something, they need to be able to ask for examples or further explanations. Dynamic and effective communication is particularly necessary as the traditional mathematics curriculum is undergoing dramatic reform. Teachers can help parents understand and support the



changes by explaining the rationale behind them and going over some of the new approaches while reassuring them that the fundamentals are still being taught.

For those parents who struggled with mathematics during their own schooling, the prospect of helping their children with their math homework can be a daunting one. “You see your child struggling, and you don’t want her to feel bad,” Thompson suggests. “So you tell her, ‘Well, dear, don’t worry; you’re just like me and you’ll never need it.’ Without meaning it, you’ve given your child the message that she doesn’t have to try because she’s not smart enough to figure it out.” These kinds of subtle discouragements stem from parents’ own anxiety about math and can exert a real influence over a child’s perception of his or her own ability or need to do mathematics.

Setting the Stage for Success

To help parents overcome their math anxiety, educators can identify for them the vast mathematics knowledge they already possess—knowledge essential to reading a map, following a recipe, budgeting, or remodeling. Even deciding how to package leftovers requires an understanding of spatial reasoning and estimation, skills that are key to geometry. “Parents know more than they think they do,” Thompson says.

Another way caregivers can help their children is to model explorative learning, acknowledging that answers are not always immediately apparent. Thompson cautions that parents often “tell” their children too fast, rather than allowing them time to work through the material. “Parents must understand that when they



tell their children the right answers or do difficult problems for them, they prevent them from becoming active investigators. They rob their children of a vital learning tool.”

In contrast, effective questioning draws upon established knowledge and encourages exploration, developing skills that are applicable to a range of real-world situations. Parents can help their children reason through their challenges by asking questions such as: What have you tried? Would drawing a picture help? Can you make a chart? Is there a pattern? Have you done a similar problem? By asking these kinds of questions and participating with their children in the discovery process, parents are released from the need to have all the answers and instead become co-learners.

Bringing Families into the Equation

This is the model of learning that informs the work Thompson and her colleagues do with FAMILY MATH, an international program that has already reached more than two million families. Developed by EQUALS at the Lawrence Hall of Science, FAMILY MATH targets populations that are traditionally underrepresented in mathematics careers. Working to change people’s attitudes toward math, the program relies on community and

school collaborations to create informal, nonthreatening environments where families can come learn together.

FAMILY MATH classes are often held in community recreation centers, churches, libraries, and museums by teachers, parents, and other community members. They offer parents and students fun, non-threatening ways of approaching mathematics and learning through problem solving and word play. A class of approximately 25 people participates in small-group exercises where instructors demonstrate mathematical games that parents and their children can play together. The activities are curriculum-based and created from low-cost materials so that they can be readily duplicated in the home.

The key to the program’s success, Thompson believes, is the fact that parents and children come into it together. The parents gain insights about themselves and about how their children think. “When parents sit down with their child and learn together, they get to see their child thinking,” Thompson explains. “Their attitude changes from ‘I don’t know anything about math and I can’t help my child’ to realizing that they can play a very important role in reinforcing their children’s mathematics education.” ❖

The information provided in the following pages is taken from ENC's Resource Finder. Pricing and ordering information was verified September, 1998, and is subject to change. To see the complete catalog record for any resource, go to ENC Online (<http://www.enc.org/>). Search strategies can be found on page 3 of this *Focus*.

CURRICULUM RESOURCES

FAMILY MATH Series

FAMILY MATH for Young Children: Comparing

Grades pre-K-3
1997

Author: Grace Davila
Coates, Jean Kerr Stenmark

Ordering Information:
University of California,
Berkeley
EQUALS Publications
Lawrence Hall of Science
Berkeley, CA 94720-5200
Telephone: (510) 642-1910
Toll-free: (800) 897-5036
Fax: (510) 643-5757
<http://www.lhs.berkeley.edu/>

\$18.95 per book

The explorations in this book are designed for parents of young children. Activities center around the theme of comparing as applied to numbers and measurements. Parents also learn how to be more involved at school and how to help children at home. The program uses games, activities, and explorations that integrate logical reasoning, measurement, geometry, and spatial thinking. These activities also develop such important mathematical skills as probability, estimation, and arithmetic. The book incorporates beans, buttons, pennies, and toys in solving math problems. These objects may be used to explore shapes and geometry, estimate numbers and sizes, and complete activities



and play games. Such common household objects also help students and parents connect math with real life. One possibility for exploring estimation, for example, is to fill a small jar with about ten large marshmallows, then fill the same size jar with smaller marshmallows and compare the different amounts. This book contains material adapted from the EQUALS program. (Author/LDR) ENC-010948

Ordering Information:
University of California,
Berkeley
Lawrence Hall of Science
Berkeley, CA 94720
Telephone: (510) 642-1910
Toll-free: (800) 897-5036
Fax: (510) 643-5757
<http://www.lhs.berkeley.edu/>

\$18.95 per book

Funding: U.S. Department
of Education; Fund for the
Improvement of Postsecondary
Education; Carnegie
Corporation of New York

appropriate grade level, lists needed materials, and provides a rationale for doing the activity or describes its connection to the mathematics curriculum. Directions are included for preparing and carrying out the activity, and all needed game boards or worksheets are provided. In addition, each activity includes suggestions for extension or adaptation of the exercise. The book contains ideas for creating an environment that makes mathematics attractive and interesting for children and includes ideas for parents to consider as they do mathematics at home. Sample activities include games that provide practice in arithmetic skills and mental arithmetic; word problems and strategies to solve them; and activities that develop understanding of concepts such as factors, prime numbers, fractions, place value, and proportion. The book also includes hands-on experiments that develop an intuitive understanding of probability theory, as well as calculator activities that develop pattern recognition and understanding of number relationships. An appendix discusses how to organize a FAMILY MATH class, including suggestions for grade levels, scheduling, location, and recruiting. Other helpful tips include obtaining financial support, welcoming families, setting up learning stations, and designing lesson plans. Assessment and evaluation suggestions are also included. A second appendix lists the mathematics topics generally covered in grades K-8. Also provided are addresses of publishers and a list of 37 resources for parents and teachers. (AM) ENC-000589

FAMILY MATH

Grades K-8
1986

Author: Jean Kerr Stenmark,
Virginia Thompson, and Ruth
Cossey

The activities in this book come from the FAMILY MATH program and are designed to be used both in a FAMILY MATH class and independently by a parent at home. These activities involve experimenting, discovering, mathematical reasoning, and problem solving. Many of them develop understanding with hands-on materials. Topics include arithmetic, geometry, probability, and statistics. Other subjects covered include measurement, logic, and calculators. Each activity page gives the

Generationally Gooley: A Science Program for Jr. Einsteins

Grades K-8
1998

Author: The Wild Goose
Company

Developed as part of a family science program, this book contains instructions, demonstrations, and activities designed to teach and entertain students, teachers, and other guests such as parents, local leaders, and school business partners. The program is based on a three-step learning model of explore, explain, and apply. It consists of four presenter-led demonstrations and five different participation stations. The demonstrations present scien-

Ordering Information:

The Wild Goose Company
375 W. Whitney Avenue
Salt Lake City, UT 84115
Telephone: (801) 466-1172
Toll-free: (800) 373-1498
Fax: (801) 466-1186
wgoose9150@aol.com
<http://wildgoose-science.com/>

\$29.95 per activity guide

Note: Materials kit is also available for \$129.00. Please contact vendor for further information.

Playtime Is Science: An Equity-based Parent/Child Science Program

Grades Pre-K-3

1997

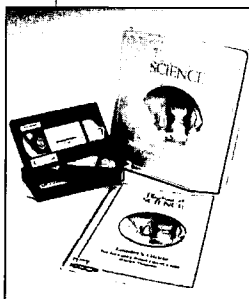
Author: Text written by Barbara Sprung, Merle Froschl, Linda Colon; video produced, written, and directed by Jamil Simon

Ordering Information:

Educational Equity Concepts, Inc. (EEC)
114 East 32nd Street
New York, NY 10016
Telephone: (212) 725-1803
Fax: (212) 725-0947
eedequity@con2.com

\$249.00 per kit

Funding: Dewitt Wallace Reader's Digest Fund; Toyota USA Foundation; National Science Foundation



tific magic tricks, such as the one that makes use of Bernoulli's principle to fly a windbag indoors. For other tricks, presenters use colloid gels to make water disappear and manipulate air pressure to move a balloon into a jar. In the station activities, participants learn the secret of the disappearing water, make a polymer goo, and build lung-powered rockets out of drinking straws. They also experiment with acids and bases and explore some common genetic traits, such as the ability to taste PTC paper. For each activity, the book provides a list of required materials, an illustrated procedure, and a scientific explanation. It also provides suggestions for organizing the family science program, a sample flyer, and safety considerations. A supply kit is also available. (Author/LCT) ENC-012294

This program incorporates science and scientific thinking into children's daily routines through hands-on physical science activities. It takes a process-oriented approach to create a partnership between school, home, and community. The kit includes a facilitator's notebook, three videos, a leader's guide, and a poster. The facilitator's notebook discusses the program's science equity philosophy and features activities for teacher and parent training workshops. Workshop materials include training tips and outreach tools. The activities use inexpensive and recyclable items such as cooking oil, plastic bottles, and old socks. Each activity card provides a step-by-step procedure, lists time and material requirements, and summarizes learning objectives, skills development and equity goals, and career connections. It also provides ideas for

home connections, integration of the activity into other subject areas, and grade-specific modifications. In a sample activity, participants read *Bartholomew and the Oobleck* by Dr. Seuss, then explore the properties of liquids and solids as they make their own oobleck. The videos, filmed in schools, homes, and communities across the country, feature interviews with parents, teachers, and students. The leader's guide provides materials for training teachers to implement the program, including equity and hands-on science activities, planning and self-assessment tools, organizing tips, and training agendas. (Author/LCT) ENC-011185

Project PRISM

Parents as Leaders in Science and Mathematics Education Reform

Grades K-12

1994

Author: National Urban League

Ordering Information:

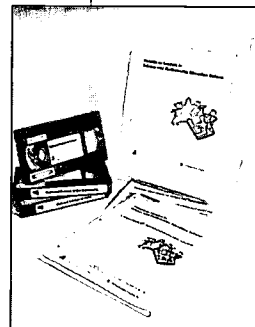
Corporation for Public Broadcasting (CPB)
PO Box 2345
South Burlington, VT 05407
Toll-free: (800) 965-7373
Fax: (802) 864-9846
<http://www.leamer.org/>

\$59.95 per kit

Note: Specify English or Spanish.

Funding:

Annenberg/CPB
Math and
Science Project



Partners for Reform in Science and Math (PRISM) is designed to increase parent awareness of the need to reform science and mathematics education; to inform parents about what they can do at home to help their child succeed in these subjects; and to help parents locate resources. This outreach kit contains program materials in English and Spanish for three workshops. It includes a sourcebook for parent and community leaders with instructions for using the kit materials. Overviews are provided of the three English-language videos and the one Spanish-language video, along with step-by-step activities for the three interactive workshops. Also included are 100 examples of community participation in science and math education reform. The English videos emphasize the importance of prob-

lem solving and thinking skills in math and science education today. These videos highlight families, schools, and programs from around the country that are helping children excel in math and science. The Spanish video, designed especially for Spanish-speaking parents, explains the elements of good science education. All the materials emphasize the central role parents play in forming positive attitudes toward math and science. (Author/JRS) ENC-011769

Involving Parents in Education

Grades K-12

1992

Author: producer, John M. Checkley; director/writer, Jim Oppenheimer

Ordering Information:

Association for Supervision and Curriculum Development (ASCD)
1703 North Beauregard Street
Alexandria, VA 22311-1714
Telephone: (703) 578-9600
Toll-free: (800) 933-2723
<http://www.ascd.org/>

\$290.00 per set (members)

\$340.00 (non-members)

Order # 614235

This video-based staff development program examines how two schools, one rural and one urban, involve parents in their operation. The guide is based on two assumptions: all parents want their children to succeed in school and want to help if they can; and schools must take the lead in supporting parents. The video focuses on five areas of school-parent interaction: parenting skills, communication, volunteering, learning at home, and parents representing other parents. The program emphasizes the reality that there is no single "right" way to involve parents but, rather, several ways. Suggestions range from in-home preschool education, to use of a cable television show, *Homework Hot Line*, where elementary students and parents can phone in to ask a math teacher homework questions. The accompanying guide includes leader's notes and blackline masters of handouts. (Author/JRS) ENC-011922

Annenberg/CPB Math and Science Collection
Math for All

Grades K-3

1993

Author: Executive producer, Patricia Cabrera; producer, Hanne Bauer; director/editor, Pablo Helman

Ordering Information:

Corporation for Public Broadcasting (CPB)
 PO Box 2345
 South Burlington, VT 05407
 Toll-free: (800) 965-7373
 Fax: (802) 864-9846
<http://www.leamer.org/>

\$69.95 per set

Funding: Annenberg Foundation/Corporation for Public Broadcasting; Elementary and High School Project for Mathematics and Science

Operating from the premise that parents are a child's first and most important teachers, these videos show adults how to do fun, hands-on activities with young children to help them develop basic mathematical skills. Emphasis is on the many everyday opportunities parents have to help their children understand mathematical ideas, because mathematics is found everywhere, not only in the classroom. Led by a friendly teacher and student assistants, the lessons use common items such as beans, string, buttons, and spoons to demonstrate the fun and practical side of math. Each of the two 30-minute tapes contains four lessons, with three or four activities each. In a sample activity, Number Neighbors, children practice ordering numbers from one to 20 and using left and right directions as they arrange numbered clothespins on a wire coat hanger. Each lesson contains a short home video clip showing parent and child interaction during a lesson. The lesson ends with a brief reminder of what each activity will teach, along with an exercise for viewers to try, such as: If you have three types of crackers and three toppings, how many different snacks can you make using one cracker and one topping? Included with the set is an activity guide that outlines the activities on the tapes and gives directions for making simple equipment such as a balance scale. Also provided in the guide are suggested extension activities for older children and further reading for parents. The videos are available in Spanish. (Author/JRS) ENC-011740



Each lesson contains a short home video clip showing parent and child interaction during a lesson. The lesson ends with a brief reminder of what each activity will teach, along with an exercise for viewers to try, such as: If you have three types of crackers and three toppings, how many different snacks can you make using one cracker and one topping? Included with the set is an activity guide that outlines the activities on the tapes and gives directions for making simple equipment such as a balance scale. Also provided in the guide are suggested extension activities for older children and further reading for parents. The videos are available in Spanish. (Author/JRS) ENC-011740

Ordering Information:

Curriculum Associates, Inc.
 PO Box 2001
 North Billerica, MA 01862
 Telephone: (978) 667-8000
 Toll-free: (800) 225-0248
 Fax: (800) 366-1158
<http://www.curriculumassociates.com/>

\$21.95 per teacher's resource book

Order # YH7124

\$2.98 per workshop training manual

Order # YH7630

hands-on learning, and authentic assessment of learners. Adult participants can also develop their own scientific literacy as they promote and support scientific curiosity and understanding in children. The activity book contains 26 science activities related to forces, energy, and chemical and physical properties. In a sample activity, students raid the kitchen cupboards to find out why the chocolate in a glass of chocolate milk always settles to the bottom. They also make a simple periscope and design a greenhouse for the garage window using old plastic soda bottles. Each activity includes a list of required household materials, scientific explanations, and an illustrated procedure. Some activities include data charts and extension activities. A glossary and bibliographic references are provided. The training manual for *Science at Home* workshops provides an overview of the program, guidelines for planning and conducting the workshop, and suggestions for evaluating and extending the program. An annotated sample activity and a sample invitation are also included. (Author/LCT) ENC-013213

Every Child a Scientist: Achieving Scientific Literacy for All

Grades K-12

1998

Author: Committee on Science Education K-12 of the Center for Science, Mathematics, and Engineering Education (CSMEE)

Ordering Information:

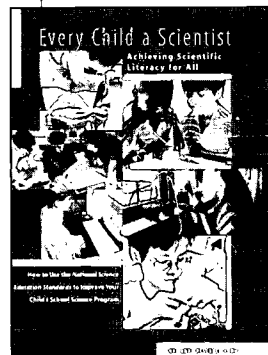
National Academy Press
 Lockbox 285
 2101 Constitution Avenue NW
 Washington, DC 20055
 Telephone: (202) 334-3313
 Toll-free: (800) 624-6242
 Fax: (202) 334-2451
<http://www.nap.edu/>

Parents and all who want to improve the science program in their schools can read this booklet to learn why high-quality science education is important for all children and young adults. The first section argues that science should be a part of all students' education. In the second section, readers will find a vision of the curriculum and teaching in a classroom where students can gain the understanding of science and technology that they need in today's society. Sections three and four outline how the *National Science Education Standards* (1995) can help improve the quality of the science being taught and how it is assessed. The last section suggests what readers can do to become partners in improving science teaching and learning. (Author) ENC-012129

\$10.00 per book (paperback)

Standards: National Science Education Standards (NSES) (December 1995)

Funding: National Science Foundation



Science at Home

Grades 4-8

1998

Author: editors, Dale Lyle, Charles C. Poling

The *Science at Home* program was designed to demystify science and to involve scientists, teachers, parents, and children in the process of education. This activity book and companion training manual provide activities and workshop materials to encourage families to do hands-on science at home. In addition to providing young students with an opportunity to explore and develop their natural interest in science, the activities are designed to emphasize higher-order thinking skills,

Science Simply Amazing Kit

Grades K-8

1996

Author: Executive producer, Sandra Sheppard; written and produced by Bob Morris

Ordering Information:

Corporation for Public Broadcasting (CPB)
PO Box 2345
South Burlington, VT 05407
Toll-free: (800) 965-7373
Fax: (802) 864-9846
<http://www.learner.org/>

\$19.95 per video and guide



This video package was designed to help parents of elementary and middle school students become familiar with the *National Science Education Standards* and constructivist approaches to science teaching and learning. The video explores changes in science education by taking viewers to a variety of formal and informal educational settings. Viewers are also taken to the Children's Museum of Indianapolis, where a single parent and his daughter join other parents and children for a Family Science workshop. The video goes into the homes of parents who turn everyday activities—such as taking a walk or playing with a

toy rocket—into opportunities to explore the world through science. The accompanying parent's guide features informal articles that explain the new science education, as well as activities for fun science learning outside of school. It also offers practical suggestions for improving school science programs. (Author/LCT) ENC-010683

Teacher TV

Parental Involvement

Grades K-12

1993

Author: producer, writer, Paulette Moore; series producer, Phyllis Ward; produced by Ward and Associates for The Learning Channel

Ordering Information:

National Education Association (NEA)
PO Box 2035
Annapolis, MD 20701
Telephone: (301) 617-7830
Toll-free: (800) 229-4200
Fax: (301) 206-9789
<http://www.nea.org/>

\$19.95 per video (non-member price)
Order # 7782-2-00-PL

From the series *Teacher TV* comes this video that highlights activities in two school districts with successful programs designed to increase parents' involvement in their children's learning. The tape begins with a district in Virginia that has been successful in increasing parental involvement by sponsoring a mobile Parent Resource Center (PRC). The PRC, a converted 35-foot mobile home, is designed to bring the school into the community and to meet parents when they are available; for instance, during lunch breaks and after pick-up at day care. The success of the PRC has led to the development at an elementary school of a walk-in resource center, which offers everything from computers to study guides for the GED. The second segment of the video highlights a Nevada school district's four-year initiative to draw parents into schools in order to improve the child's education. Each school in the district designed its own approach to involving parents; three successful approaches are shown on the video. Also included is a discussion between parents and teachers about the importance of parental involvement. (JRS) ENC-012279

Teacher TV

Parents as Partners

Grades K-12

1993

Author: Connie Bottinelli, Carolyn Weidman Dunlap, Stan Gibell, Eddy Gattis; series producer, Warren Weidner

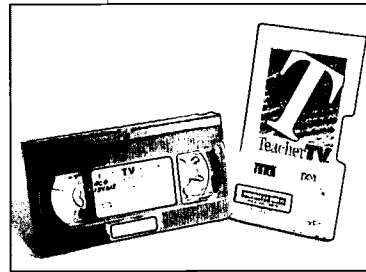
Ordering Information:

National Education Association (NEA)
PO Box 2035
Annapolis, MD 20701
Telephone: (301) 61-77830
Toll-free: (800) 229-4200
Fax: (301) 206-9789
<http://www.nea.org/>

\$19.95 per video (non-member price)
Order # 7754-7-00-PL

The activities in this video demonstrate how to create partnerships between parents and schools. The series documents innovative educational techniques from educators around the country. The tape begins by describing how approximately one-third of the nation's preschoolers are inadequately prepared for school. The tape goes on to document two parent-education programs that make a difference in the lives and education of young children. The first is Parent University in Nevada, which offers parenting courses throughout the year. The value of the program to parents is shown through testimonials from parents about the improvement the courses have made in their family life. The second highlighted program provides educational home visits for parents of preschool students in Texas. The goal of this program is twofold: to help orient children to education early and to empower parents as the first teachers of their children.

During weekly home visits, the teacher instructs parents about how to reinforce at home the concepts their children are learning at preschool. The final segment describes a parent-sponsored program



from Washington state that provides enrichment classes for elementary students during their teachers' weekly afternoon release time for planning and professional development. (JRS) ENC-012280

Teacher-to-Teacher Series

Building Parent Partnerships

Grades pre-K-12

1996

Author: Karen Gutloff, editor

Ordering Information:

National Education Association (NEA)
PO Box 2035
Annapolis, MD 20701
Telephone: (301) 617-7830
Toll-free: (800) 229-4200
Fax: (301) 206-9789
<http://www.nea.org/>

\$12.95 per book (non-member price)
Order # 2911-9-00-P

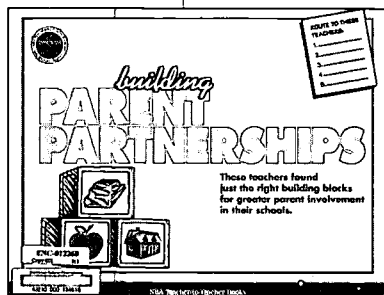
The six programs profiled in this teacher resource book are given as successful examples of encouraging parents to play an active role in their children's education. The Teacher-to-Teacher series presents classroom teachers speaking to other teachers about education issues that include school change, student assessment, and multiple intelligences. In this book, the six programs about parental involvement show schools successfully overcoming obstacles to involvement, which include lack of child care and transportation, language and cultural differences, and mistrust of the education system. In one example, a middle school created a day called "Manic Monday" in which parents and students exchange places for the day. As a result of this

experience, parents reported feeling more connected to their child's education. In another example,

an elementary school conducted workshops to give parents the tools they need to teach kids about responsibility, confidence, motivation, respect, and other life skills. The goal was to equip parents with skills that were complementary to school initiatives in changing attitudes and behaviors.

Included at the end of each story are lesson plans, checklists, and handouts to use when implementing ideas from the story. At the back of the book, a checklist is provided to help evaluate how parent-friendly a school is. Also included is a list of selected resources with ideas for building strong partnerships with parents.

(Author/JRS) ENC-012260



Activities in a Bag

Math in a Bag

Grades K-4

1995
 Author: Nancy A. Silva; illustrator, Keith Vasconcelles; editors, Evan D. Forbes, Waller Kelly

Ordering Information:
 Teacher Created Materials, Inc.
 6421 Industry Way
 Westminister, CA 92683
 Toll-free: (800) 662-4321
 Fax: (800) 525-1254
<http://www.teachercreated.com/>

\$9.95 per book
 Order # TCM199

These intriguing, practical activities for the entire family are designed to reinforce basic skills and promote real-world problem solving. This book contains formatted scavenger hunt lists on reproducible, perforated blackline pages as well as follow-up activities for each hunt. Teachers are advised to staple the lists on paper bags and hand them out to students. Students then take their bags home and hunt with their families. When the full bags come back to school, the class completes follow-up activities intended to tie in homework, stimulate math discussion, and bring math studies to life. In one scavenger hunt, for example, families search for items related to the number 100: the name of a town 100 miles away; an advertisement for an item selling for \$100; and a school paper with a grade of 100 percent. In class, students do problems about driving to their towns; figure out sales tax and sale rates on their advertised items; and classify and chart the graded papers by subject. (Author/KFR) ENC-007801

Bowdoin Method Series

Expanding Your Child's Math Ability

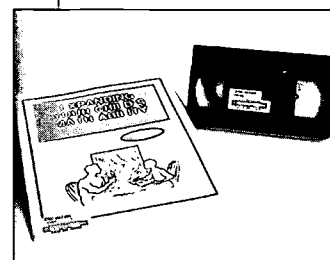
Grades 1-4

1993
 Author: Executive producer, Robert N. Gleaves

Ordering Information:
 Webster's International, Inc.
 5729 Cloverland Place
 Brentwood, TN 37027
 Toll-free: (800) 727-6833
 Telephone: (615) 373-1723
 Fax: (615) 373-1030

\$55.00 per leader's guide
 \$3.99 per parent's guide
 \$54.60 per video

Part of the *Bowdoin Parent Education Program*, this kit suggests constructive ways parents can help their elementary school children become more successful in math. The kit contains materials for a presentation to a parent group: a workbook, a 12-minute video, and a lesson plan for the presentation. In this program, parents are urged to encourage their children by checking homework, using everyday situations to teach number facts and their applications, and playing math games together. The tape and workbook emphasize that understanding each child's needs and abilities is important in developing healthy attitudes toward math. Also stressed is that teaching children to think is



the real goal of education, not just giving the answer. Another premise of the kit is that home motivation is the key to success for each student. The workbook ends with sugges-

tions for math games using playing cards, dominoes, and calendars. Users will find ideas for ways to encourage drill games for memorizing number facts. In addition, parents can learn how to establish positive communication with their child's math teacher and school. (Author/JRS) ENC-011410

Math on Call: A Mathematics Handbook

Grades 6-8

1998
 Author: Andrew Kaplan

Ordering Information:
 Great Source Education Group
 181 Ballardvale Street
 Wilmington, MA 01887
 Telephone: (508) 661-1511
 Toll-free: (800) 289-4490
 Fax: (800) 289-3994
<http://www.greatsource.com/>

\$10.75 per copy (when buying 25 or more)
 Order # G5-045770

This handbook for middle school students provides detailed and illustrated mathematical explanations of topics from number theory, algebra, statistics, and geometry. In the graphs and statistics chapter, for example, a discussion of the mean includes investigating the effect of a large data entry on the mean and using this to lead into the concept of the median. This student reference also includes an almanac section with math prefixes and suffixes, problem-solving strategies, study tips, guidelines for using spreadsheets and databases, and test-taking strategies. Included is a yellow pages section, which has glossaries of formulas and mathematical terms with extensive cross-referencing. The chapter pages have color-coded edges for ease of referencing. (Author/JRS) ENC-011854

BEST COPY AVAILABLE

Beyond Facts and Flashcards: Exploring Math with Your Kids

Grades K-6

1996

Author: Jan Mokros and
TERC

Ordering Information:

Heinemann Educational
Books, Inc.
361 Hanover Street
Portsmouth, NH 03801-3912
Toll-free: (800) 541-2086
Telephone: (603) 431-7894
Fax: (800) 847-0938
custserv@heinemann.com
<http://www.heinemann.com/>

\$16.95 per book
Order # 08375

Standards: NCTM
Curriculum and
Evaluation
Standards (1989);
NCTM Professional
Standards (1991)



This book debunks the myth that there are those who learn to do math easily and those who are doomed never to experience success in math. It offers parents practical ways to provide children with needed practice in math, along with a collection of games and activities that encourage them to become successful math learners. Parents learn how the activities relate to mathematics, what they can reasonably expect a child to understand, and how to ask questions that prompt and support mathematical learning. One chapter records a day in the author's family, describing the varied opportunities for integrating mathematics activities into daily living. For example, a child cuts out coupons from the Sunday newspaper that match the grocery list items, then figures the total coupon savings.

This collection of exercises is intended to foster mathematical literacy, including an understanding that reasoning and using evidence to prove a point are the basic standards of truth in mathematics. The book also develops a feel for the relative size of numbers and for how numbers are put together. (Author/LDR) ENC-008967

Math Power: How to Help Your Child Love Math, Even If You Don't

Grades pre-K-5

1997

Author: Patricia Clark
Kenschaft

Ordering Information:

HarperCollins Publishers, Inc.
1000 Keystone Industrial Park
Scranton, PA 18512-4621
Toll-free: (800) 242-7737
Fax: (800) 822-4090
information@harpercollins.com
<http://www.harperchildrens.com/>

\$15.00 per book (paperback)

Standards: NCTM Curriculum
and Evaluation Standards
(1989)

Written for parents who want to be involved in their child's mathematical development, this book describes the realities of mathematics education today and offers inspiration and suggestions. The book describes mathematics as the study of patterns and explains what math ability is, how mathematics works, and how math interest and ability can be nurtured. The author offers strategies for understanding and teaching math concepts and for overcoming mediocre math teaching. She also includes games and specific activities that can help students develop their natural math ability. Some examples include familiar games, such as dominoes, Chutes and Ladders, and Concentration. A number of activities integrate math into everyday life, such as counting anything and everything and making peanut butter and jelly sandwiches in geometric shapes. Also addressed are issues surrounding present-day mathematics education, including the NCTM standards. A checklist describes what a child should know mathematically for each grade K-5, with a special discussion of the crisis often faced in grade 5, where students may feel overwhelmed or bored in math class. The appendices contain extensive references for parents, such as organizations, free catalogs, and Internet resources. (Author/JRS) ENC-012256

Math: Facing an American Phobia

Grade K and up

1998

Author: Marilyn Bums

Ordering Information:

Cuisenaire
PO Box 5026
White Plains, NY 10602-5026
Toll-free: (800) 237-0338
Fax: (800) 551-7637
<http://www.cuisenaire.com/>

\$12.95 per book (paperback)

Math has a bad reputation with the American public, and this book for parents and teachers proposes reasons why. It also discusses how adults can avoid having children adopt their own math-phobic attitudes. The chapters trace the conflict between the public's assumption that mathematics means arithmetic and the belief of mathematics educators that classroom mathematics must foster reasoning, thinking, and problem-solving skills. The book begins by outlining the mathematics involved in preparing the Thanksgiving Day dinner: figuring the size of the turkey, the amount of stuffing required, and the cooking time, and compares this practical mathematics to what is taught in schools. Other topics include the value of timed math tests, the use of expanded student answers in student-teacher communication, and the appropriate use of the calculator. The final chapters contain practical suggestions to help children avoid math phobias. An answer key contains solutions and explanations for the problems found in the book. (Author/JRS) ENC-012250

Exploring Everyday Math: Ideas for Students, Teachers, and Parents

Grades K-6

1993

Author: Maja Apelman and
Julie King

Ordering Information:

Heinemann Educational
Books, Inc.
361 Hanover Street
Portsmouth, NH 03801-3912
Toll-free: (800) 541-2086
Telephone: (603) 431-7894
Fax: (800) 847-0938
custserv@heinemann.com
<http://www.heinemann.com/>

\$25.00 per book
Order # 08341

The authors of this teacher's guide address two themes: the problem of the isolation of mathematics learning from life experience, and the need for parent involvement in children's mathematics learning. Most of the activities in the book begin in the classroom, where students are encouraged to use their imagination, share ideas, and ask questions on topics from their daily lives. The premise is that students will respond enthusiastically to the activities and will be prepared to participate in the second phase, which takes place at home. Parents and other family members are asked to join in the process, contributing information, sharing their knowledge, and taking part in the investigations.

With the completion of the home phase, the program is wrapped up in the classroom where students compile, organize, and interpret the ideas and information they gathered at home. They then present their findings through murals, graphs, written descriptions,

Exploring Everyday Math

Ideas for
Students,
Teachers,
& Parents



Maja Apelman and Julie King

Standards: NCTM Curriculum and Evaluation Standards (1989)

books, or displays. In addition to the activity plans, the guide contains an extended discussion of how children learn mathematics. A curriculum chart shows how the activities can be used to address specific mathematical topics for different grade levels. Also provided are sample letters to parents and book lists on specific topics. (Author/GMM) ENC-006935

Teaching Children Mathematics Journal

Beyond the Classroom: Linking Mathematics Learning with Parents, Communities, and Business and Industry

Grades pre-K-6
February 1998 (Vol. 4, No. 6)

Ordering Information:
National Council of Teachers of Mathematics, Inc. (NCTM)
1906 Association Drive
Reston, VA 20191-1593
Telephone: (703) 620-9840
Toll-free: (800) 235-7566
Fax: (703) 476-2970
nctm@nctm.org
<http://www.nctm.org/>

\$57.00 per NCTM membership

Note: One subscription comes with NCTM membership. Additional subscriptions for individuals are \$18.00 each.

This issue of the journal explores ways to extend mathematics education beyond the classroom and emphasizes the importance of involving parents and communities in the learning of mathematics. The publication is the official journal of the National Council of Teachers of Mathematics and is intended to be a source of activities and pedagogical strategies for pre-K-6 mathematics education. This focus issue provides examples of successfully implemented projects and activities that encourage interaction between parents and schools. It also gives resources for facilitating learning at home. Two departments regularly featured in this journal are Links to Literature and Math by the Month. In the Links to Literature article, an inservice teacher describes the creation of a mathematical lending library at her elementary school. With books and manipulatives for teaching mathematical concepts, the library is designed to help strengthen the home-to-school connection. In Math by the Month are weekly activities designed



to be open-ended, hands-on, and fun, in order to develop problem-solving skills. In one activity, students roll dice, find the sum or difference of the numbers rolled, then cover that number on a paper strip numbered one to nine. In another, children play a variation of Tic Tac Toe on a 10-by-10 coordinate grid. Portfolios and parent networking are also discussed in this journal. References are provided with each article. (Author/CMS/JRS) ENC-012322

Family Internet Companion

Grades K-12
1997

Author: staff writers, Christopher J. Mautner and Chris Noonan Sturm; editor, Dorissa Bolinski

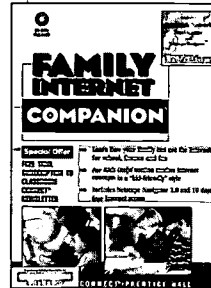
Ordering Information:
Classroom Connect, Inc.
431 Madrid Avenue
Torrance, CA 90501
Toll-free: (800) 638-1639
Fax: (888) 801-8299
connect@classroom.com
<http://www.classroom.com/>

\$34.95 per book (with hybrid CD-ROM)

Order # HOM-1010-C181

Note: Contact publisher for system requirements.

This guidebook and accompanying CD-ROM are designed to help families get the most out of the Internet. The book begins with a general description of the Internet and the World Wide Web. Additional topics include going online, solving technical difficulties, and monitoring children's use of the Internet. The book also contains directions for building a family Web page and examples of Web sites built by people of all ages, nationalities, and races. As users read about each site, the book guides them through navigation steps screen by screen so they can do the same while sitting at their computer. The guide also provides a directory of family-oriented Web sites. The CD-ROM provides a number of software tools, including free Internet access software from a national provider; a copy of the popular blocking software programs CyberPatrol and SurfWatch; and hot lists with hyperlinked Internet sites. (Author/LCT) ENC-012328



Internet Homework Helper

Grades K-12
1997

Author: senior writer, Tim McLain; editor, Dorissa Bolinski

Ordering Information:
Classroom Connect, Inc.
431 Madrid Avenue
Torrance, CA 90501
Toll-free: (800) 638-1639
Fax: (888) 801-8299
connect@classroom.com
<http://www.classroom.com/>

\$29.95 per book (with CD-ROM)

Order # RES-1020

Note: Contact publisher for system requirements.

Students can use this guidebook and accompanying CD-ROM to locate Internet sites with information for specific homework assignments. The book begins with a general description of the Internet, its history, and how to get connected. It also describes how to use each of the Internet's seven main navigation tools: e-mail, the Web, gopher, file transfer protocol (ftp), telnet, Usenet newsgroups, and Internet Relay Chat (IRC). Students also learn how to create their own Web pages and how to download images and video for multimedia presentations. Throughout the book, students find examples of Web sites built by people of all ages, nationalities, and races from all over the world. A resource section sends students to the best homework helping sites and gives information on citing electronic resources in bibliographies. The CD-ROM provides a number of software tools, including free Internet access software from a national provider; a copy of the popular blocking software programs, CyberPatrol and SurfWatch; and hot lists with hyperlinked Internet sites. (Author/LCT) ENC-012329

INTERNET SITES FOR PARENTS**Helping Your Child Learn Science**

<http://www.ed.gov/pubs/parents/Science/index.html>

Grades pre-K-6

The U.S. Department of Education has provided this online edition of a booklet of ideas and activities that help parents do science with their children at home. Included are basic information about science and a sampling of activities for children to do in both the home and the community. Children learn about plants, animals, and the physical world through these activities, many of which cost little or nothing and require no special equipment. Sample activities include using celery to demonstrate capillary action, sticking straws into potatoes to see the effects of inertia and momentum, and growing crystals and examining them with a magnifying glass. The section on using community resources features hints on trips to zoos and science museums and how to make the most out of a nature hike. Winner, ENC Digital Dozen, May 1996. (Author/SSD/RA) ENC-011342

Helping Your Child Learn Math

<http://www.ed.gov/pubs/parents/Math/>

Grades pre-K-7

Intended for parents of children in pre-K to grade 7, this online version of the same-titled book contains guidelines for parents who want to help their children learn math. It explains that in addition to basic computation, children need to learn to solve problems, communicate mathematically, and reason. It features real-world activities designed to help children learn basic mathematical skills such as sorting, classifying, comparing, working with money, and measuring. These activities are based in three locations—home, grocery store, and in transit—and are arranged at increasingly harder levels of difficulty. Winner, ENC Digital Dozen, April 1996. (DDD/JRS) ENC-011078

ERIC Resources: Parent Brochures

<http://www.aspensys.com/eric/resources/parent/parent.html>

Grades pre-K-12

Maintained by the Educational Resources Information Center (ERIC), this Web site contains online versions of more than 30 ERIC brochures developed to answer parents' questions about educational issues. The pamphlets address such topics as parents as teachers, computer uses in education, early childhood development, and planning for college. Additional topics include study skills, safety and self esteem issues, and subject and grade specific content issues. Ordering information and links to additional ERIC information are also provided. (Author/LCT) ENC-011881

Parents' Guide to the Internet

<http://www.ed.gov/pubs/parents/internet/index.html>

Grades K-12

This Web site is the online version of a book intended to help parents—regardless of their level of technological expertise—make use of the Internet as an educational tool. The guide gives parents an introduction to the Internet, including how to navigate. It also suggests how parents can allow their children to tap into the Internet while safeguarding them from its potential hazards. Links are provided to some family-friendly Web sites. Also included are a glossary of Web-related terminology and a brief history of the Internet. (Author/LCT) ENC-011882

The Children's Partnership

<http://www.childrenspartnership.org/>

Grades pre-K-12

The Children's Partnership is a national nonprofit, nonpartisan organization whose mission is to inform leaders and the public about the needs of America's 70 million children. The partnership undertakes research and policy analysis, publishes reports and multimedia materials, and forges new alliances among parents, policy makers and the private sector to achieve tangible gains for children. Some of its programs include America's Children and the Information Superhighway, a multi-year project exploring how the Internet and related technologies can best serve children. Other projects include Next-Generation Strategies to Build an American Children's Movement, the mission of which is to broaden the constituency for children and help design effective strategies to advance and sustain a children's social agenda. Winner, ENC Digital Dozen, November 1997. (Author) ENC-010899

**National Association for the Education of Young Children (NAEYC)**

<http://www.naeyc.org/>

Grades pre-K-1

NAEYC developed this site as a source of information for parents and teachers of young children. Numerous articles discuss the growth and education of young children. A sample article is "Math and the Myth of One, Two, Three," which stresses the importance of hands-on counting and sorting activities for young children, in contrast to rote memorization of numbers. For professionals in early childhood education, the site has a separate section with information on accreditation of early childhood centers, conferences, published materials, and membership in NAEYC. Included is a searchable index. (JRS) ENC-011615

Surfing the Net with Kids

<http://www.surfnetkids.com/>

Grades K-12

At this award-winning site, users will find the online version of Barbara Feldman's syndicated newspaper column, *Surfing the Internet with Kids*. It contains links to kid-friendly, educational sites and provides information about Internet safety and guidelines for parents. Each week, this site features five fun, educational Web sites on topics as diverse as gargoyles, inventors, or Apollo 11. Each site is reviewed, rated, and organized by topic. Additional topics include science and mathematics, geography and social studies, language arts and creative arts, and holidays, games, and hobbies. (Author/LCT) ENC-011880

National Parent Information Network Resources for Parents

<http://ericps.ed.uiuc.edu/npin/respar.html>

Grades K-12

Two ERIC Clearinghouses collaborate to produce this Web site, which provides information and fosters electronic communications among parents and those who work with them. Examples of science and math resources for parents include Science and Math Are for Girls, Science and Math at Home for Young Children, and Ten Characteristics of Good Science Programs. Other topics in support of parent educators include early intervention, multicultural education, collaboration, and parent involvement. Some innovative programs are listed by state. Winner, ENC Digital Dozen, August 1995. (Author/DEB) ENC-002376

America Links Up

<http://www.netparents.org/>

Grades K-12

Designed for parents who want to protect their kids from inappropriate material online, Netparents.org was developed by an ad hoc coalition of Internet businesses, nonprofit groups, and public interest advocates to help educate the public about the availability of user empowerment tools. The site includes a list of products designed to give parents the ability to block their children's access to certain sites as well as tips for managing children's use of the Web. Also listed are Internet Service Providers, state by state, that offer parents the ability to configure accounts to control children's access to the Web. For parents interested in rating systems, this site offers links to information on four content rating systems for the Internet. (Author/RMK) ENC-012530



Education Central

<http://www.parentsoup.com/edcentral/>

Grades K-12

Maintained for parents with children in grades K-12, this site contains message boards, chat rooms, and links to online resources that provide information about educational issues such as standardized testing, technology in the classroom, and learning disabilities. Additional topics include home schooling and parent/teacher relations. The site contains resources for helping students deal with school-related social challenges, from biting and fighting in preschool and elementary school to peer pressure and dating in middle and high school. Parents can also find information about schools around the country through School Searchers. Additional features include resources for college planning and finding school supplies. (Author/LCT) ENC-012325



Family Involvement in Children's Education: Successful Local Approaches

<http://www.ed.gov/pubs/FamInvolve/>

Grades K-12

This Web site, provided by the U. S. Department of Education, is designed to help school administrators, K-12 teachers, policy makers, and parents build strong family-school partnerships. The site contains case studies of 20 successful education programs that illustrate what can be done to help increase the involvement of low-income families in education. The case studies are also designed to show how all families can become more active participants in their children's education. Studies show that family involvement leads to better grades, more positive student attitudes, higher graduation rates, and increased enrollment in higher education. Ideas include school-based parent education programs and parent resource centers. Information on resources includes organizations and related publications. (Author/JRS) ENC-011838

CURRICULUM RESOURCES

Gobble up Science: Fun Activities to Complete and Eat

Grades 1-4
1996

Author: written by Carol A. Johmann and Elizabeth J. Rieth; illustrated by Kelly Kennedy

Ordering Information:
The Learning Works
Dept. NEIC
PO Box 6187
Santa Barbara, CA 93160
Telephone: (805) 964-4220
Toll-free: (800) 235-5767
Fax: (805) 964-1466
info@TheLearningWorks.com
http://www.thelearningworks.com/

\$10.95 per activity book

This book contains activities and experiments that use food as catalysts for learning about science. Children learn basic science concepts as they experiment with their sense of taste, mix solutions to make a variety of colors, and grow rock candy crystals. They also predict whether salt will make something sweet taste even sweeter, interpret data as they try to keep fruit from turning brown, and record data on the chemical reactions that occur in their mouths. Each hands-on activity uses easy-to-prepare foods and equipment that can be found in most kitchens. The activities that require adult supervision for cutting fruits and vegetables and using the oven are indicated, as well as any inedible parts of the experiment. Children can test their knowledge with word finds, mazes, and cross-word puzzles. Scientific explanations and extension activities are included. (Author/LCT) ENC-011934

Gobble up Math: Fun Activities to Complete and Eat

Grades K-3
1994

Author: Sue Mogard and Ginny McDonnell; illustrated by Kelly Kennedy

Ordering Information:
The Learning Works
Dept. NEIC
PO Box 6187
Santa Barbara, CA 93160
Telephone: (805) 964-4220
Toll-free: (800) 235-5767
Fax: (805) 964-1466
info@TheLearningWorks.com
http://www.thelearningworks.com/

\$10.95 per book

These activities for parents and teachers encourage investigation of patterns, sets, fractions, and estimations. Using foods as catalysts for learning math concepts and good nutrition, children make cheese slices into fractions, feel the circumference of an apple, and see the varieties of patterns that can be created using pretzels. Each hands-on activity uses accessible, healthy, and easy-to-prepare foods. Instructions are included for setting up a functional math center and helping parents work with their children at home. In one activity, a child forms a square with nine graham crackers and then counts the number of squares and rectangles of any size that can be found. In another activity, a carrot is used to measure the height of the child, the length of a table, a window's width, and three other objects reinforcing the meaning of tall, long, and wide. After each activity, the child is encouraged to gobble up the materials used in the exercise. There are posters about washing hands, the food pyramid, and certificates for completion of activities. A bibliography for children is included. (Author/JRS) ENC-011929

The Math Chef: Over 60 Math Activities and Recipes for Kids

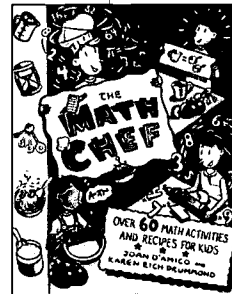
Grades 3-8
1997

Author: Joan D'Amico, Karen Eich Drummond; illustrations by Tina Cash-Walsh

Ordering Information:
John Wiley and Sons, Inc.
One Wiley Drive
Somerset, NJ 08875-1272
Telephone: (908) 469-4400
Toll-free: (800) 225-5945
Fax: (908) 302-2300
http://www.wiley.com/

\$12.95 per book

Children can use this book to learn about mathematics and cooking and how the two are connected. The book is full of activities and recipes that require only common ingredients and kitchen utensils. The first section covers the basics about kitchen tools, cooking skills, and safety rules. The rest of the book is divided into four parts, each on a broad mathematics topic. Each chapter begins with an introduction to a concept, followed by a related cooking activity. The last part of each chapter provides several recipes that implement the math skill of the chapter. Each recipe is rated by level of difficulty. One geometry chapter, for example, is on diameter. In the activity, children trace a circular plate on a piece of paper, cut it out, and fold it in half to help measure the diameter. The five recipes in the chapter all involve circles, and children are asked to find the diameter of these circles as they cook. The book also contains a glossary and sections on nutrition and food safety. (Author/KFR) ENC-004721



Cooking Art: Easy Edible Art for Young Children

Grades pre-K-3
1997

Author: MaryAnn F. Kohl and Jean Potter

Ordering Information:
Gryphon House, Inc.
PO Box 207
Beltsville, MD 20704-0207
Toll-free: (800) 638-0928
Fax: (301) 595-0051
info@ghbooks.com
http://www.ghbooks.com/

\$14.95 per book (paperback)

More than 100 recipes are provided in this children's cookbook, which is designed to incorporate art and cooking. Organized by theme, such as shapes and forms, animals and creatures, and transportation and travel, the recipes include beverages, salads, sandwiches, entrees, and desserts. In sample cooking activities, children practice writing their numbers as they decorate "Counting Sugar Cookies." They also use cheese slices and vegetables to sculpt a variety of birds and animals, and look for buried treasure in a tower of pudding. Each recipe is illustrated with blackline diagrams and includes icons that indicate preparation time and level of difficulty. Seasonal and holiday recipes are also included. (Author/LCT) ENC-012218

BEST COPY AVAILABLE

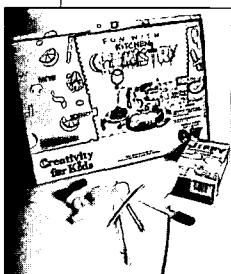
32

Fun with Kitchen Chemistry

Grades 4-8
1996

Ordering Information:
Creativity for Kids
1802 Central Avenue
Cleveland, OH 44115-2325
Telephone: (216) 589-4800
Toll-free: (800) 642-2288
Fax: (216) 589-4803
<http://www.creativityforkids.com/>

\$22.00 per kit
Order # 1104



Fun with Kitchen Chemistry introduces children to chemistry through a series of fun, hands-on activities designed to stimulate students' interest and curiosity. Using materials in the kit, students make rock candy, cheese, pretzels, and invisible ink. They also learn about fermentation, enzymes, molecular motion, and chromatography. The kit provides the needed materials for the experiments, including food coloring, yeast, gelatin, litmus paper, and basic equipment. It also provides a set

of illustrated experiment cards that give background information and instructions. A glossary and a bibliography are included. Kits for ecology, photography, magnets, and dinosaurs are available. (Author/LCT) ENC-008626

Little Critters Secret Swamp

Grades pre-K-2
1998

Ordering Information:
Learning Resources
380 North Fairway Drive
Vernon Hills, IL 60061
Telephone: (847) 573-8406
Toll-free: (800) 222-3909
Fax: (800) 222-0249

\$13.95 per puzzle
Order # LER 1256T

Developed as part of a series of floor puzzles, this kit introduces children to the plants and animals that inhabit a swamp. In addition to the puzzle, the kit includes an activity guide, a magnifying glass, and five colorful game pieces. The completed puzzle presents a watercolor picture of a swamp with creatures such as turtles, frogs, and snakes, as well as dragonflies and waterstriders. The activity guide contains a Swamp Story and ideas to help children interact with the puzzle, magnifier, and game pieces. The game pieces can be used for counting, classifying, and comparing the animals. Additional fun facts and discussion questions are included. (Author/LCT) ENC-013067

Sharks!

Grades pre-K-2
1998

Ordering Information:
Learning Resources
380 North Fairway Drive
Vernon Hills, IL 60061
Telephone: (847) 573-8406
Toll-free: (800) 222-3909
Fax: (800) 222-0249

\$13.95 per puzzle
Order # LER 1257T

This puzzle kit, part of the series described above, introduces children to the undersea world of sharks. The completed puzzle presents a watercolor picture of six sharks: a hammerhead shark and a sawshark, a zebra shark and a whale shark, and a tiger shark and a great white shark. The activity guide contains ideas for role playing, guessing games, and fun facts. In a sample activity, children use the shark figures to act out the events of a follow-along shark story. They also use the puzzle to solve simple counting, addition, and subtraction problems and to compare sharks based on their size and color. (Author/LCT) ENC-013068

The Magic School Bus

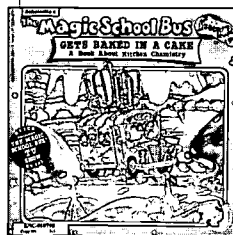
The Magic School Bus Gets Baked in a Cake: A Book about Kitchen Chemistry

Grades K-6
1995

Author: TV tie-in book adaptation by Linda Beech; illustrated by Ted Enik

Ordering Information:
Scholastic, Inc.
2931 E McCarty Street
Jefferson City, MO 65101
Toll-free: (800) 724-6527
Fax: (314) 635-5881
CustServ@scholastic.com
<http://www.scholastic.com/>

\$2.99 per book (paperback)



This picture book, based on an episode from the animated television series, introduces readers to some of the chemical reactions that occur as a cake is prepared. In the story, the students decide to surprise Ms. Frizzle with a cake for her birthday. On their field trip to the bakery, the magic school bus shrinks down to the size of a moth and falls into the cake batter. The students experience how heat causes chemical reactions when the cake is placed in the oven. The end of the book contains additional facts about kitchen chemistry and an experiment that shows how the gas produced by mixing vinegar with baking soda can make peanuts float. (Author/LCT) ENC-010795

Newton's Apple

Newton on Slime

Grades 3-12
1995

Ordering Information:
The Wild Goose Company
375 W. Whitney Avenue
Salt Lake City, UT 84115
Telephone: (801) 466-1172
Toll-free: (800) 373-1498
Fax: (801) 466-1186
<http://wildgoosescience.com/>

\$17.99 per kit
Order # WG-5001

The experiments in this science kit let students make slime, goo, and foam. Using a mixture of two of the states of matter, including such combinations as a gas in a solid or a liquid in a gas, children study the chemical properties of polymers and colloids. In one activity, for example, glue, polyvinyl alcohol, and sodium tetraborate are mixed and students are asked to describe some of the properties of the resulting polymer. The kit contains the materials and chemicals needed for the experiments and a manual to guide and explain the experiments. Adult supervision is recommended for most of the activities. (FEB) ENC-005826

Constellation Station: A NOVA Science Game

Grades 5-8
1993

Author: game concept and constellation illustration, Tom and Joan Booth; booklet design, Hugo Cruz Moro

Using the lore, legend, and science behind the constellations, this board game introduces students to the study of astronomy and space science. The object is to score points by colonizing the constellations—landing on them and identifying or recalling facts about them. Three levels of difficulty offer opportunities to master new information. The game is designed so that beginners and advanced players can play each other in a competitive game by following rules for their level of play. In level one, students colonize a constellation by recognizing the shape and pronouncing the name

Ordering Information:
Aristoplay, Ltd.
450 South Wagner Road
Ann Arbor, MI 48103
Telephone: (734) 995-4353
Toll-free: (888) 478-4263
Fax: (734) 995-4611
info@aristoplay.com
http://www.aristoplay.com/

\$25.00 per game
Order # 608A

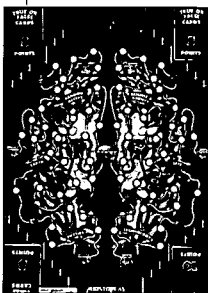
True Science: Science Facts Stranger Than Fiction!

Grades 4-12
1993

Author: game creator,
Lorraine Hopping Egan,
design and illustration,
Patricia Cheal

Ordering Information:
Aristoplay, Ltd.
450 South Wagner Road
Ann Arbor, MI 48103
Telephone: (734) 995-4353
Toll-free: (888) 478-4263
Fax: (734) 995-4611
info@aristoplay.com
http://www.aristoplay.com/

\$25.00 per game
Order # 624A



of the constellation. Level two requires students to recall facts in a single category about constellations, such as common name, location, history, or myth. As students play at higher levels, they are asked for more detailed information. The game ends when all 12 zodiac constellations have been colonized. A guide to astronomical terms, a list of planetariums, and bibliographic references are included. Winner, Learning Magazine, Teachers' Choice Award, 1994. (Author/LCT) ENC-003206

This game stimulates student interest in science by entertaining them with some of the quirkiest facts of current biology, geology, physics, and technology. As players move around the Big Brain game board, they answer questions in six categories: physics, Earth science, life science, technology, science and society, and a random-access category where anything goes. The 900 science questions are based on everyday science principles that apply in many different situations. On the True False level, players decide if a statement is true or false using basic knowledge, logic, or sheer guesswork. The Genius level challenges more knowledgeable players with short-answer questions. The winner is the first to accumulate 100 points. The game also includes a glossary of scientific terms and a directory to science museums in the U.S. and Canada. (Author/LCT) ENC-002987

MATHEMATICS GAMES & MANIPULATIVES

Smart Arithmetic Game Mats

Grades 4-6
1996

Author: Rhea Irvine, Kathryn Walker, Meg Babcock

Ordering Information:
Creative Publications
5623 West 115th Street
Alsip, IL 60803
Toll-free: (800) 624-0822
Fax: (800) 624-0821
http://www.creativepublications.com/

\$5 per game set

This kit is a collection of five games on four game mats. The games provide practice in basic fact memorization and mental computation for addition, subtraction, multiplication, and division. Colored cubes, cubic dice, and decahedron dice are included. On one game mat with spaces numbered from nine to 100, all players begin on nine. After rolling a decahedron, players divide the number on which the cube is sitting by the number rolled on the die. Players move forward the number of spaces indicated by the remainder. The first one to pass 100 is the winner. Game variations are suggested. (Author/LDR) ENC-011020

Smart Arithmetic Series

Dice & Card Games

Grades 4-6
1996

Author: Rhea Irvine, Kathryn Walker

Ordering Information:
Creative Publications, Inc.
5623 West 115th Street
Alsip, IL 60803
Toll-free: (800) 624-0822
Fax: (800) 624-0821
http://www.creativepublications.com/

\$9.95 per game set
Order # 10829-7101

This collection of 15 dice and card games comes complete with an instruction booklet. The games provide practice in basic fact memorization and mental computation for addition, subtraction, multiplication, and division. The set includes blank cubic dice with labels, cubic dice, decahedron dice, and cards numbered from zero to nine. For one game, each player is dealt four cards and then has to form a complete equation using any combination of operations of three numbers to equal the fourth number. For example, if the cards seven, two, three, and five form a player's hand, then the player could use the equation two times five minus seven equals three. Game variations are suggested. (Author/LDR) ENC-011018

Decimal Squares Games

Grades 3-9
1995

Author: Albert B. Bennett, Jr.

Ordering Information:
Scott Resources and
Hubbard Scientific Inc.
PO Box 2121
Fort Collins, CO 80522
Telephone: (970) 484-7445
Toll-free: (800) 289-9299
Fax: (970) 484-1198
http://Checkmate1.com/
AMEP/

\$20.95 per game
Order # D0895

These eight games cover basic decimal concepts, including equality and inequality of decimals and the four operations with decimals. Up to four students can play one game at a time using the set of Decimal Squares, squares that are color-coded for tenths (red), hundredths (green), and thousandths (yellow). In one of the games, Decimal Squares Bingo, students shuffle red and green Decimal Squares, place them in a deck face down, and take turns drawing from the top of the deck. Students then match the geometric decimal representations on the Decimal Squares with the numerical decimal representations on their bingo cards. (Author/CMS) ENC-010934

Mathos

Grades 5-9
1997

Ordering Information:
Research Development
Corporation
2875 Towerview Road,
Suite A4
Hemdon, VA 22071
Telephone: (703) 904-1808
Toll-free: (800) 583-2248
Fax: (703) 904-1812
http://www.rdcpublishing.com/

\$6.95 per game



Grouped in small teams, students must apply the rules for order of operations to numerical expressions in order to match problems with correct answers. Students are given a set of cards; a problem appears on the right half of each card, and the answer to a different problem appears on the left half. As a correct answer is found, the end with the right answer is placed next to the corresponding problem. The first team to match all the cards in its set wins. (Author/LDR) ENC-010356

Match Linear Graphs: A New Multi-Level Experience in Algebra

Grades 8–11

1997

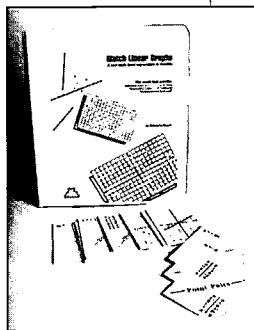
Author: Catheryne Draper

Ordering Information:

The Math Studio
81 Washington Street, Suite 3
Salem, MA 01970
Telephone: (978) 741-4305
Fax: (978) 741-4305
cdraper@mathstudio.com
<http://www.mathstudio.com/>

\$14.50 per card deck

Note: Add 10% for shipping and handling.



These five decks of cards with teacher's manual provide students with a visual association for algebraic expressions and a structure for learning the components of linear functions in both the equation and graphic forms. Each 60-card deck contains cards that feature important components of linear equations, such as graphs or equations of lines, slope values, or y-intercept values. In one sample activity, students practice identifying the equations of parallel and perpendicular lines in a "graph identification bee": they find the graph cards and equation cards for lines parallel to a graph displayed on the overhead. A small-group activity asks students to match slope cards with equation cards and then with graph cards. After completing both activities, students answer questions concerning their observations about parallel and perpendicular lines. The teacher's manual contains all prerequisite information, discusses the constructivist approach to learning, and correlates activities with the NCTM standards. It also provides student activity sheets that can be used for whole classroom instruction, cooperative group discussion, and alternative assessments. Also included are directions for card games similar to Concentration, Go Fish, and Rummy. (Author/JRS) ENC-012255

Math Games Series

Math Wizardry for Kids

Grades 4–7

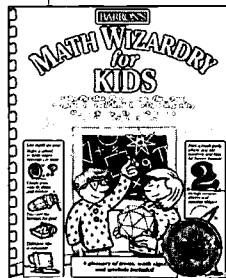
1995

Author: Margaret Kenda and Phyllis S. Williams; illustrated by Tim Robinson

Ordering Information:

Barron's Educational Series, Inc.
250 Wireless Boulevard
Hauppauge, NY 11788
Toll-free: (800) 645-3476
Fax: (516) 434-3217

\$13.95 per book



Students become "math wizards" to play this book's more than 200 math puzzles, games, diagrams, and projects about numbers and number relationships. Teachers and parents are offered tips on how to encourage children to investigate mathematics concepts. Suggestions include making math hands-on, taking math on vacation, and promoting math activities without necessarily using the word math. Mathematical concepts are introduced by explanations or definitions, some with historical content, followed by a variety of problems. For example, one article relates the story of Leonardo of Pisa, later known as Fibonacci, and features activities on how to find Fibonacci numbers and how to ascertain whether the petals in a variety of flowers appear in the Fibonacci sequence. (Author/LDR) ENC-008472

Math Games Series

Rolling and Learning with Tri-Square Dice

Grades K–8

1992

Author: teacher's guide by Thomas Silva

Ordering Information:

Creative Enterprises, Inc.
PO Box 304
Mattapoisett, MA 02739
Telephone: (508) 758-6543
creative@ma.ultranet.com
<http://www.s-t.com/creative/>

\$15.00 per game

This set of games consists of a 14-sided die and a book of 66 math and learning games designed around everyday activities. The uniquely shaped die is made up of six equal squares and eight equal triangles. Players practice skills in geography, banking, telling time, and fractions. Other games focus on sports and weights and measures. The games are divided into 12 categories and encompass seven levels of ability. Level one involves basic addition and subtraction, while the highest level involves more complex problems of multiplication and division. All playsheets and instructions are included. (Author/JRS) ENC-012306

Exponent War

Grades 6–9

1997

Ordering Information:

Research Development Corporation
2875 Towerview Road,
Suite A4
Hemdon, VA 22071
Toll-free: (800) 583-2248
Telephone: (703) 904-1808
Fax: (703) 904-1812
<http://www.rdcpublishing.com/>

\$5.95 per game

After dividing the deck of cards into two piles, each facing downward, players turn over and evaluate the top card on their piles. Each card shows an exponential expression, which the player simplifies. For example, if the exponential expression is three to the power of three, then the answer is 27. The player whose card shows the expression with the higher value wins both cards. If the players draw cards that contain expressions that simplify to equal values, each player places three cards face down and turns a fourth card over. The player turning over the card with the highest value wins all of the cards. The game continues until one player wins the entire deck. (Author/LDR) ENC-009453

Math Chase: Advanced Edition

Grades 6–9

1995

Author: Carol Marcotte

Ordering Information:

Scott Resources and Hubbard Scientific, Inc.
PO Box 2121
Fort Collins, CO 80522
Toll-free: (800) 289-9299
Telephone: (970) 484-7445
Fax: (970) 484-1198

\$31.95 per game

Order # D0210

Standards: NCTM Curriculum and Evaluation Standards (1989)

This colorful board game helps students master basic mathematics concepts and grade-level requirements. The game cards contain questions on computation, numeration, money, and measurement. Each card provides three questions at different levels of difficulty, so players of different ages and skills can play together. Answers to these questions are found on the backs of the cards. Players or teams take turns rolling the dice, moving their game pieces around the board, and answering mathematics questions. Each correctly answered question wins another turn. The first player or team to reach the finish line wins the game. The game comes in three versions: Advanced (grades 6–9), Intermediate (grades 4–7), and Primary (grades K–3). (Author/CMS) ENC-010932

Discriminant War

Grades 8–10
1997

Ordering Information:
Research Development
Corporation
2875 Towerview Road,
Suite A4
Hemdon, VA 22071
Telephone: (703) 904-1808
Toll-free: (800) 583-2248
Fax: (703) 904-1812
<http://www.rdcpublishing.com/>

\$6.95 per game

Algebra students can play this card game to determine the discriminants of quadratic expressions. After shuffling and dealing the deck into two piles, both facing downward, the top card on each pile is turned over. Each card shows a quadratic equation. The player with the largest discriminant wins both cards. The game continues until one player has won all of the cards. Included is an answer sheet that lists the discriminant's value for each equation. This game contains 24 quadratic expressions printed on laminated cardstock. (Author/LDR) ENC-009455

Ordering Information:
Conceptual Math Media, Inc.
236 W. Portal Avenue, Suite
332
San Francisco, CA 94127
Telephone: (415) 665-6608
Fax: (415) 665-1412
info@PlayEquate.com
<http://www.PlayEquate.com/>

\$34.00 per game

Standards: NCTM
Curriculum and Evaluation
Standards (1989)

large numbers can be formed by placing number tiles adjacent to one another. The rules booklet describes how to play at three different beginner levels, includes answers to frequently asked questions, and presents a review of fractions. The booklet also contains the rules for the order in which operations must be performed and gives ideas for using the game in the classroom. The game is designed to improve thinking skills, develop number sense, and build a foundation for success in algebra. (Author/JRS) ENC-011323

Witzle Pro Game

Grades 1–8
1997

Ordering Information:
Kaidy Educational Resources
1323 Columbia, Suite 307
Richardson, TX 75081
Telephone: (972) 234-6161
Toll-free: (800) 365-2439
Fax: (800) 425-2439
KaidyEd@aol.com
<http://www.kaidy.com/>

\$13.00 per game
Order # KDY747

The Witzle Pro game, which can be played independently, in a group, or with the family, lets students practice number facts, problem solving, and mental math. It comes with three number cubes and 40 cards, each printed with a unique grid of nine numbers. Each turn begins by rolling the number cubes and adding up the face values; this sum becomes the target number. Students then choose three numbers from any horizontal, vertical, or diagonal row on their card. Using each number once and any of the four arithmetic operations, students try to combine the three numbers in the row to obtain the target number. Points are scored for correct answers and for tallying the numbers used to reach the target. There are instructions for seven levels of play and several game variations. (Author/JRS) ENC-012153

Muggins

Grades 1–10
1990

Ordering Information:
Old Fashioned Products, Inc.
Route 2
PO Box 2091
Ellijay, GA 30540
Toll-free: (800) 962-8849
Fax: (706) 635-7672
muggins@ellijay.com

\$9.95 per individual wipe-off
board game
\$1.50 per overhead trans-
parency

The square wooden board used in this game has 36 numbered slots around it and a groove to hold each player's marbles. During each player's turn, three dice are rolled and the face values are totaled using addition, subtraction, multiplication, or division. The player's marble is placed on the board at the slot with that total. Strategies include trying to prevent the opponent from creating runs, or rows of adjacent marbles, which are worth extra points when scoring. Play continues until all places are filled or a player runs out of marbles. Game variations include Supermuggins, which uses three twelve-sided dice, and Muggins, Jr. for young children, which uses only addition and subtraction operations. In one suggested classroom variation, Top Gun, a student tries to fill every slot on the board in the fewest rolls of the dice. (Author/JRS) ENC-012234

FraConcepts Educational Tools FraCard

Grades 3–8
1993

Ordering Information:
Kaidy Educational Resources
1323 Columbia, Suite 307
Richardson, TX 75081
Toll-free: (800) 365-2439
Telephone: (972) 234-6161
Fax: (800) 425-2439
KaidyEd@aol.com
<http://www.kaidy.com/>

\$5.00 per card game set
Order # KDY311

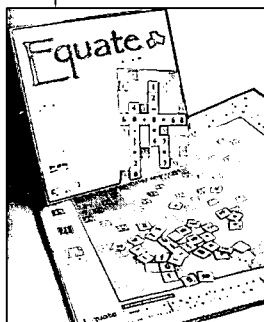
Standards: NCTM
Curriculum and Evaluation
Standards (1989)

Part of the *FraConcepts Educational Tools* series, this card game set of 59 cards provides five challenging mathematical card games. The series contains kits with a variety of instructional tools for visually demonstrating computation facts for fractions. In this set, the cards picture both pie and bar units of fractional values to visually reinforce the meaning of fractions. The card games themselves involve naming and recognizing equivalent fractions, as well as adding and subtracting fractions. In one game, for example, players add and subtract the values on the cards they were dealt to reach zero; in another, they arrange their cards' numerical values in ascending order and then verify the order with the bar graphs on the cards. There is an instruction card and teacher handout for each game. (Author/JRS) ENC-011466

Equate: The Equation Thinking Game

Grades 3–12
1996

Author: inventor and rules
booklet author, Mary Kay
Beavers



Computing and strategic thinking skills are sharpened in this board game, which can be played at several skill levels. Working with an array of nine tiles that represent numbers and operations, players form horizontal and vertical equations by placing tiles on the board. Each successive play must connect with a previous play. Players take advantage of both individual score symbols on the tiles and premium board positions. Mixed numbers and

True Math: Math Facts to Use and Amuse!

Grades 5–12
1995

Ordering Information:
Aristoplay, Ltd.
450 South Wagner Road
Ann Arbor, MI 48103
Telephone: (734) 995-4353
Toll-free: (800) 634-7738
Fax: (734) 995-4611
<http://www.aristoplay.com/>

\$25.00 per game
Order # 806A

Based on more than 900 mathematically related questions from science, architecture, engineering, and art, this game uses a geodesic patterned game board. Players move by rolling a die, and points are earned by landing on designated spaces and correctly answering a question. The questions include concepts from such categories as geometry, size and scale, numbers, and logical thinking. One example of a true/false question is the following: All of your best friends were born on the second day of November. They all have birthdays that are composite numbers—true or false? In another



example, Frieda says to Rita: "The day before yesterday I was 15, but next year I'll turn 18. What date is my birthday?" Suggested game variations are included. (Author/LDR) ENC-010996

Every Day Counts Partner Games

Every Day Counts Partner Games, Level 1

Grade 1
1996

Author: Patsy F. Kanter and Janet G. Gillespie

Ordering Information:
Great Source Education Group
A Houghton Mifflin Company
181 Ballardvale Street
Wilmington, MA 01887
Toll-free: (800) 289-4490
Telephone: (508) 661-1511
Fax: (800) 289-3994
<http://www.greatsource.com/>

\$35.00 per game package
Order # C6-044377

This set of hands-on materials and teacher's guide for 20 math enrichment games, part of the *Every Day Counts Partner Games* series, develops number concepts that include recognizing patterns, matching quantities, and counting by twos. The series introduces numbers and math symbols as a way to record results of hands-on investigations. It also emphasizes the importance of manipulatives in reinforcing number concepts. Materials in this kit include two-color counters, number cubes, dice, and a deck of 40 cards illustrating numbers 1–10 with both dots and numerals. The guide gives directions for introducing the games in the classroom, at home, or in a tutorial setting. Through these games, children practice ordering quantities, creating and reading two-digit numbers, and using counting-on to find sums and differences. In a sample game, "High-Low," number cubes are tossed to create two-digit numbers. The players compare their numbers and the player with the greater number wins the round. Included in the guide are game variations and informal assessment tips. (Author/JRS) ENC-012310

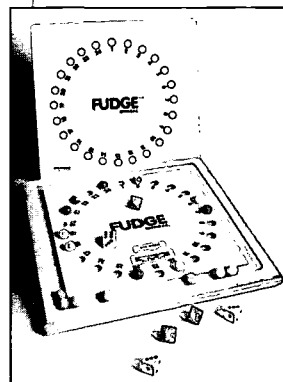
Fudge [and] Knock-out

Grades 3–12
1997

Ordering Information:
Old Fashioned Products, Inc.
Route 2
PO Box 2091
Ellijay, GA 30540
Toll-free: (800) 962-8849
Fax: (706) 635-7672
muggins@ellijay.com

\$9.95 per individual wipe-off board game
\$1.50 per overhead transparency

The Fudge side of this square wooden board has 24 spaces arranged in a circular pattern and uses three eight-sided dice. During each turn, the player rolls three dice and the face values are combined using addition and/or subtraction. Several totals are possible with each roll; a player chooses the optimal result and places a marble at the corresponding space on the board. Players try to occupy three spaces in a row; this is called a piece of fudge. Two pieces of fudge make a batch, and the



first player with a batch of fudge wins. On the reverse side is the Knockout game, which has two concentric circles of slots (numbered one to 18) for placing marble markers. During each turn, three dice are rolled and the face values are combined using addition or subtraction. The

player's marble is then placed in the slot corresponding to that number, or marbles are placed in all the slots needed to add up to that number. A player can replace, or knock-out, an opponent's marble by occupying the same space.

(Author/JRS) ENC-012242

The following games are prepared by Vasha Rosenblum and are available from:

Math Games for Kindergarten–Grade 5
2690 Altadena Road
Birmingham, AL 35243
Telephone: (205) 969-2254
E-mail: vashan@bham.mindspring.com

Note: To order any of the next five games, add \$2.50 for postage (or 10% of the total, whichever is greater) and make checks payable to Vasha Rosenblum.

Tabby Cats

Grades 3, 4
1996

\$1.50 per game

The game board for Tabby Cats contains a trail of 58 squares, each with a multiplication problem to solve. Students take turns rolling a die and counting out the number rolled on the game board. Students then do the multiplication problem in the square and the product is covered with a marker on the student's individual Tabby Cat score card. The set contains instructions and reproducible game boards. (Author/JRS) ENC-012274

Rio; Reverse Rio; Multiplication Bingo

Grades 3-5
1996

\$1.50 per game

Based on work done by Constance Kamii, these games are designed to give children practice using multiplication tables. There are playing cards for all numbers from zero to 100 that are products found by using the one to 10 multiplication tables. In the game of Rio, players choose one multiplication table and scatter the 11 cards that are products of that multiplication table face up in the playing area. Players take turns rolling a 12-sided die that has faces labeled with numerals zero to 10 and the letter R. The face value rolled is multiplied by the multiplication table number and the player puts a chip on the card with that product number. The winner is the first player with no chips. Also included are directions for Multiplication Bingo. (Author/JRS) ENC-012272

Salute; Salute with 1's, 10's and 100's

Grades 3-5
1994

\$2.50 per game

This set contains instructions and reproducible playing cards for all the numbers from one to 10, multiples of 10 to 100, and multiples of 100 to 900. Cards are divided equally between two players. In each round, a third student, designated the "calculator," tells the other two players to salute each other, military style, with a playing card. The calculator announces the sum, difference, or product of the two cards used in the salute, depending on which arithmetic operation they are practicing. The two players look at each other's cards and race to guess the value of the number in his or her hand. The first player to give the correct answer takes both cards. Players rotate the roles of calculator and card holders. Teachers can regulate the level of the game by removing the tens and hundreds cards. (Author/JRS) ENC-012273

Just Cards

Grades K-4
1995

\$1.00 per game

Playing modified versions of familiar card games, such as Concentration, Card Dominoes, and War Multiplication, students work on their computation skills. The reproducible playing cards are numbered from one to 10 with countable squares, triangles, pentagons, and circles on the face of each card, rather than the traditional four suits. In a sample game, "Fives," only the cards with numbers one to four are used; the object of the game is to make a total of five with two cards. All cards are dealt and piled face down in front of each player. The first player places his top card in the center, face up, forming the discard pile. Each player turns over his top card and checks to see if his card plus the top discard will total five. If the two cards total five, the player wins the pair. The person with the most pairs wins the game. Also included in this set are games for evaluating more and less, sequencing numbers, and forming sets. The games are from Constance Kamii class notes, 1990. (Author/JRS) ENC-012271

Doubles + 1 Cover-Up

Grades 1, 2
1997

\$1.00 per game

Children practice doubling the numbers one to 10 while developing number sense about odd numbers. The reproducible board is numbered with the odd numbers from three to 21. Players take turns rolling a 10-sided die, doubling the number, adding one, and covering that numeral on their side of the board. Play continues until a player has covered all the numbers on her side of the board. Instructions are included. The game appeared in *Young Children Continue to Reinvent Arithmetic* by Constance Kamii. (Author/JRS) ENC-012269

CURRICULUM RESOURCES

Bill Nye the Science Guy

Nutrition

Grades 4-8

1995

Author: Executive producers and directors, James McKenna and Erren Gottlieb; writers, Bill Nye, James McKenna, Erren Gottlieb, Melissa Gould, Michael Gross, Mark Ashton Hunt, Jon Sherman, Amy Axt-Hanson, and Ian Saunders

Ordering Information:

Disney Educational Productions
105 Terry Drive, Suite 120
Newtown, PA 18940
Toll-free: (800) 295-5010

\$49.95 per video

This series of videotapes is designed to motivate children to explore science in the world around them. Each tape in the series focuses on a single science topic. In this episode, viewers go along with Bill Nye to learn about carbohydrates, proteins, and fat and their importance in maintaining good health and nutrition. Nye and his cohorts describe how food provides heat energy and talk about minerals, vitamins, fiber, and their importance. Hands-on experiments demonstrate how to



test for the presence of starch. A teacher's guide describes all the topics covered in the series and provides related hands-on activities that students can do in the classroom and at home. The package also includes posters featuring Bill Nye.

(Author/RA) ENC-006115

Bill Nye the Science Guy

Wetlands

Grades 4-8

1995

Author: Executive producers and directors, James McKenna, Erren Gottlieb; writers, Bill Nye, James McKenna, Erren Gottlieb, Melissa Gould, Michael Gross, Mark Ashton Hunt, Jon Sherman, Amy Axt-Hanson, Ian Saunders

Ordering Information:

Disney Educational Productions
105 Terry Drive, Suite 120
Newtown, PA 18940
Toll-free: (800) 295-5010

\$49.95 per video

Bill Nye the Science Guy shows encourage students to explore science in the world around them. This episode focuses on wetlands and teaches viewers about all the different types of wetlands, such as swamps and marshes. Viewers also learn of the importance of wetlands and the impact humans have had on them. Additional subjects include the wildlife and vegetation that inhabit wetlands. The video describes how wetlands clean water, mentions the effect of pollution on wetlands, and features hands-on experiments testing how wetlands protect areas from flooding. Related hands-on activities can be done in the classroom and at home. Bill Nye posters are also included in the teacher's guide. (Author/RA) ENC-006023

Mathnet

The Case of the Dirty Money

Grades 3-6

1991

Author: Square One Television and Children's Television Workshop

Ordering Information:

Great Plains National
PO Box 80669
Lincoln, NE 68501-0669
Telephone: (402) 472-2007
Toll-free: (800) 228-4630
Fax: (800) 306-2330
gpn@unl.edu
http://www.gpn.unl.edu/

\$19.95 per video (teacher's guide included)

Order # 502

There is a mystery that must be solved: three dump trucks have a tendency to disappear and then reappear without the dirt they were carrying. Students learn why the dirt may be valuable and find the criminal using mathematical tools such as estimating, finding number patterns, and using ratios. The video is part of the *Mathnet* series, which comprises five detective serials featuring two ace mathematicians who work with the police department to solve the mysteries using a variety of problem-solving strategies. For each of the *Mathnet* mysteries, the teacher's guide contains a plot summary and five related activities. Of these, two are class-length activities with step-by-step instructions, reproducible activity sheets, and follow-up activities. Sample activities on this tape engage students in exploring volume and dimension by modeling the size of a



dump truck and constructing boxes, varying their dimensions and finding the volumes. In another activity, students make rubbings of the bottom of their shoes, compare prints, and make a scatter plot for the lengths of their shoes. An answer key to activities is included. (JRS/Author) ENC-012286

Mathnet

The Case of the Missing Air

Grades 2-6

1991

Author: Square One Television and Children's Television Workshop

Ordering Information:

Great Plains National
PO Box 80669
Lincoln, NE 68501-0669
Telephone: (402) 472-2007
Toll-free: (800) 228-4630
Fax: (800) 306-2330
gpn@unl.edu
http://www.gpn.unl.edu/

\$19.95 per video (teacher's guide included)

Order # 502

In this video, part of the series described above, viewers follow a police case involving 22 robberies committed by someone talking like a duck. The two ace mathematicians in the series work with the police department to solve the serial mysteries using a variety of problem solving strategies. Students learn why the robberies all occurred at the same time of day and find the robber by using mathematical tools, including organizing data, looking for patterns, and logical reasoning. The teacher's guide contains a plot summary and five related activities. Of these, two are class-length activities with step-by-step instructions, reproducible activity sheets, and follow-up activities. In sample activities, students explore possible number combinations for the bills taken from four businesses during the robberies. Students also use grids to examine strategies cops and robbers can use to move stealthily on city streets. (JRS/Author) ENC-012441

Square One Television Fun

Grades 3-6
1992

Author: Square One
Television, Children's
Television Workshop

Ordering Information:
Great Plains National
PO Box 80669
Lincoln, NE 68501-0669
Telephone: (402) 472-2007
Toll-free: (800) 228-4630
Fax: (800) 306-2330
gpn@unl.edu
http://www.gpn.unl.edu/

\$15.95 per activity package
Order # 552

Note: Package includes
30 student booklets and
1 teacher's guide.

This activity book provides students an opportunity to experiment with the mathematical ideas presented in the *Square One* television series. The television series uses music videos, cartoons, and spoofs of TV shows to develop mathematical situations that involve problem solving, geometric challenges, and application of number sense. The activity book contains 20 colorful pages with a dozen or more activities including puzzles, mysteries to solve, experiments, and games for two people and for the entire class. For example, in the activity called Math Magic, students practice four of Blackstone the Magician's magic tricks and investigate how mathematics is used to create the illusion of magic. Some of the puzzles in the book have



answers on the inside back cover, but there are more puzzles that are open-ended with answers not given. The accompanying teacher's guide expands on the themes from the TV show and contains background information on each activity. (Author/JRS) ENC-012412

SportsFigures

Better Tennis Through Geometry

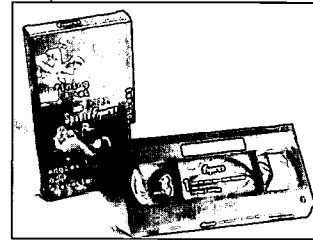
Grades 9-12
1995

Author: creative direction,
Denise A. Baylis

Ordering Information:
ESPN/Cable in the
Classroom Department
ESPN Plaza
Bristol, CT 06010
Telephone: (860) 585-2000
(ask for Marsha
MacCatherine)

\$40.00 per tape collection
(includes all 7
tapes and curriculum
book)
Order # 44100

This video segment, part of the series described earlier on this page, features tennis professional John McEnroe demonstrating how the principles of trigonometry help him keep his rocket serves in bounds. McEnroe shows students how they can use similar triangles to calculate how high a racket must be to hit a straight serve in bounds. Students then use physics to factor gravity and speed into the problem to create an appropriate formula for tennis serves. Supporting graphics identify the tri-



angles of a tennis court and slow motion sequences illustrate how gravity causes the ball's trajectory to arc. (Author/KFR/LCT) ENC-004818

Eyewitness

Ocean

Grades K-12
1997

Author: director and writer,
Ben Southwell

Ordering Information:
DK Publishing, Inc.
1224 Heil Quaker Boulevard
La Vergne, TN 37086-7001
Toll-free: (888) 342-5357
Fax: (800) 774-6733
http://www.dk.com/

\$12.95 per video

Part of a series based on the Eyewitness books, this video uses live-action photography and computer animations to introduce viewers to ocean ecosystems. The program begins with a review of the history of the Earth and the development of the oceans and land masses. It goes on to describe advances in technology that enabled humans to explore progressively deeper regions of the ocean. Segments depict typical marine life at each ocean



depth, including corals, fishes, crustaceans, and tube worms. (LCT) ENC-011143

SportsFigures

Why Do Golf Balls Have Dimples?

Grades 9-12
1995

Author: creative direction,
Denise A. Baylis

Ordering Information:
ESPN/Cable in the
Classroom Department
ESPN Plaza
Bristol, CT 06010
Telephone: (860) 585-2000
(ask for Marsha
MacCatherine)

\$40.00 per tape collection
(includes all 7 tapes and
curriculum book)
Order # 44100

This video and accompanying teacher's guide feature golf professional Tiger Woods as he uses Newton's Third Law of Motion to explain the effects of dimples and backspin on the flight of a golf ball. The *SportsFigures* video series presents 19 lessons to stimulate students' interest in mathematics and physics by showing the connections of these subjects to sports. Each video contains three lessons featuring professional athletes who demonstrate how mathematical and physical principles are used in sports. In this segment, Tiger Woods shows how the grooves on the head of a golf club cause the ball to backspin, which increases lift and allows it to travel farther. As the ball spins, the dimples on its surface create turbulence, which decreases drag and increases lift. Supporting animations and computer graphics illustrate parabolic motion and the interactions between gravity, lift and drag, and velocity and acceleration. The teacher's guide provides a lesson plan and activity sheet for each video lesson. Each lesson summarizes the academic topics and provides background information and extension ideas. The activity sheet contains additional problems and discussion questions. (Author/KFR/LCT) ENC-004809

Amazing Animals

Amazing Animal Colors

Grades K-8
1997

Author: writer, Alastair
Swinerton; director, Anne
Neale

Henry the Lizard, an animated tour guide, takes viewers on an exploration of the role of color as an animal adaptation. As he redecorates his home, Henry is introduced to the variety of colors that occur naturally in the animal world and how color functions in camouflage, warning, and courtship. Live-action segments show how the frigate bird expands his red throat to attract a mate and how poison dart frogs and skunks use color to warn off

Ordering Information:

DK Publishing, Inc.
1224 Heil Quaker Boulevard
La Vergne, TN 37086-7001
Toll-free: (888) 342-5357
Fax: (800) 774-6733
http://www.dk.com/

\$12.95 per video

Power of Algebra
Using Positive Exponents

Grades 8, 9

1988
Author: producer/director,
Clay Fourier

Ordering Information:

Great Plains National
PO Box 80669
Lincoln, NE 68501-0669
Telephone: (402) 472-2007
Toll-free: (800) 228-4630
Fax: (800) 306-2330
gpn@unl.edu
http://www.gpn.unl.edu/

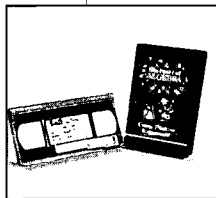
\$34.95 per video (includes
teacher's guide)
Order # 322

predators. Also covered is how the symbiotic relationship between a sloth and the algae living in its fur provides the green color that enables the sloth to hide in the trees. The videos combine 3-D animation with film of the animals in their natural habitats. (Author/LCT) ENC-011758

A missile bent on destruction misses its target by millions of miles—what happened? This video follows the adventures of a computer-animated Sherlock Holmes as he thwarts the villain, Moriarity. In the course of the program, students learn the rules for multiplying and dividing numbers written with positive integer exponents and the usefulness of scientific notation for measuring distances in space. For each of the 10 lessons, the teacher's guide contains a program synopsis, a vocabulary list, and a pre-program activity, as well as discussion questions and follow-up activities. In this program, Sherlock Holmes uses the multiplication and division rules for exponents to explain

how Moriarity's miscalculation resulted in the harmless missile. In addition, a space scientist explains the factors involved in the launch of a space shuttle and the importance of mathematics in space exploration. Pre-program activities include drawing square numbers on

grid paper and constructing cubic numbers with blocks, then finding their area and volume. (Author/JRS) ENC-012314



Power of Algebra
Basic Properties

Grades 8, 9

1988
Author: producer/director,
Clay Fourie

Ordering Information:

Great Plains National
PO Box 80669
Lincoln, NE 68501-0669
Telephone: (402) 472-2007
Toll-free: (800) 228-4630
Fax: (800) 306-2330
gpn@unl.edu
http://www.gpn.unl.edu/

\$34.95 per video (includes
teacher's guide)
Order # 322

Students can use this video to learn about the properties of addition and multiplication of numbers and variables (commutative, associative, and distributive) and how these properties may be used to simplify algebraic problems. In this program, Sherlock Holmes uses the distributive property to explain Moriarity's miscalculation of the initial velocity needed to drop a bomb on the train in which Watson and Holmes were riding. A structural engineer describes the need for a good math background for careers in engineering, where math is used every day. Follow-up activities in the teacher's guide include discussion questions about division, subtraction, and the properties. (Author/JRS) ENC-012416

Power of Algebra
Order of Operations

Grades 8, 9

1988
Author: producer/director,
Clay Fourie

Ordering Information:

Great Plains National
PO Box 80669
Lincoln, NE 68501-0669
Telephone: (402) 472-2007
Toll-free: (800) 228-4630
Fax: (800) 306-2330
gpn@unl.edu
http://www.gpn.unl.edu/

\$34.95 per video (includes
teacher's guide)
Order # 322

In this video, part of the same series described in the preceding records, Sherlock Holmes correctly applies the order of operations to explain the villainous Moriarity's miscalculation of the stopping distance for a car. The math procedures are set out through clear graphics, in a step-by-step format. Also included is an explanation by an engineer about the use of mathematics in an auto production plant and the importance of mathematics in all aspects of the manufacturing process. Follow-up activities found in the teacher's guide include a suggestion for a mnemonic to help children remember the order of operations, discussion questions about using exponents, and two worksheets for applying the rules for order of operations. (Author/JRS) ENC-012415

Reading Rainbow: Science Comes Alive
My Shadow

Grades pre-K-3

1994
Author: produced by Jill
Gluckson; directed by Mark
Mannucci

Ordering Information:

Great Plains National
PO Box 80669
Lincoln, NE 68501-0669
Telephone: (402) 472-2007
Toll-free: (800) 228-4630
Fax: (800) 306-2330
gpn@unl.edu
http://www.gpn.unl.edu/

\$45.95 per video
\$10.00 per teacher's guide

Funding: Corporation for
Public Broadcasting; National
Science Foundation; Pew
Charitable Trusts; Arthur
Vining Davis Foundations;
W.K. Kellogg Foundation

Reading Rainbow's Science Comes Alive series is designed to foster positive scientific attitudes by integrating science into the grade school curricula. This video features an illustrated version of the poem by Robert Louis Stevenson that examines the interplay between light and shadow. *Reading Rainbow* is an educational series designed to encourage and motivate young children to read good books and visit their local libraries. Each show is an upbeat, magazine-format adventure featuring a children's picture book and a medley of other segments that relate to the feature book's theme. Program segments expand the theme with animation, dramatizations, interviews, music, and book reviews written and delivered on camera by kids. In this video, host LeVar Burton demonstrates how light and shadow can be used to tell the time and how light is used in photography to expose film. Students also get a lesson on the art of creating shadow puppets. The teacher's guide identifies the scientific concepts embedded in each program and provides interactive, hands-on activities for both home and the classroom. Sample activities have students work in pairs to measure the lengths of their shadows at different times of day and examine a sun dial and explain how it works. A supplementary book list is also provided. (Author/LCT) ENC-005694

Reading Rainbow

Math Is Everywhere

Grades 3-6
1997

Ordering Information:
Great Plains National
PO Box 80669
Lincoln, NE 68501-0669
Telephone: (402) 472-2007
Toll-free: (800) 228-4630
Fax: (800) 306-2330
gpn@unl.edu
http://www.gpn.unl.edu/

\$17.00 per teacher's
guide

Standards: NCTM
Curriculum and
Evaluation Standards
(1989)

Funding: National
Science Foundation



This teacher's guide contains discussion topics and classroom activities that support the use of the *Reading Rainbow* series in mathematics instruction. Activities are provided for 33 programs in the series that have been identified as natural vehicles for math experiences. For each program there is a description, a list of math concepts, classroom activities, and a do-at-home activity. In one program, "June 29, 1999," the story of giant vegetables takes viewers on a journey into the unknown dimension of science fiction. Estimation, fractions, weight, and place value are concepts that can be

investigated through this program. The segment on giant pumpkins leads into the examination and measurement of a real pumpkin and to exploration of the question: How many pie slices can be made from a pumpkin weighing 800 pounds? The at-home activity suggests an outing to a grocery store to estimate and then find the weight of six different vegetables. In this activity, students also invent problems to relate the weights of various vegetables, such as, How many green beans will equal the weight of one tomato? All activities are consistent with NCTM standards. (Author/JRS) ENC-012287

Newton's Apple

Newton's Apple Program #1303

Grades K-12
1995

Author: producers, Emily Goldberg, Darren Howelton, Kim MacDonald, Kevin Williams

Ordering Information:
Great Plains National
PO Box 80669
Lincoln, NE 68501-0669
Telephone: (402) 472-2007
Toll-free: (800) 228-4630
Fax: (800) 306-2330
gpn@unl.edu
http://www.gpn.unl.edu/

\$24.95 per video
Order # 1303

Funding: 3M

Newton's Apple is a science series on public television that answers viewers' questions about science, nature, technology, and the world around us. Each episode is hosted by David Heil and consists of hands-on demonstrations and interviews with experts, teachers, and naturalists. In this episode, explorers go on a bike trip through Central America to explore Mayan civilization and archaeology, using a laptop computer, a satellite dish, and a few supplies to communicate their findings with experts and computer users. Also covered are facts about flowers, a description of how sound is produced and perceived by each part of the ear, and details on how noise can be hazardous to the hearing. The episode presents how a parachute works and describes the physiological features of owls. A compilation of teacher's guides accompanies each of the *Newton's Apple* episodes. The guide includes lessons related to each topic in the episode; each lesson consists of a general discussion, a main activity and several extensions for the classroom or at home, and a list of resources. (Author/RA) ENC-005985

3-2-1 Classroom Contact

Surface Tension: Bubble-ology

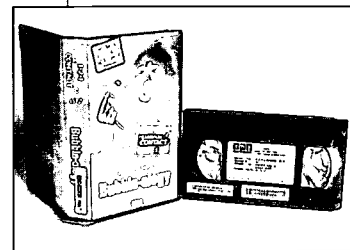
Grades 3-7
1991

Author: produced by the
Children's Television
Workshop

Ordering Information:
Great Plains National
PO Box 80669
Lincoln, NE 68501-0669
Telephone: (402) 472-2007
Toll-free: (800) 228-4630
Fax: (800) 306-2330
gpn@unl.edu
http://www.gpn.unl.edu/

\$19.95 per video:
\$12.00 per teacher's guide
Order # 322

Funding: National
Science Foundation;
U.S. Department of
Education



Hosted by teenagers, this video engages viewers in experiments and observations involving surface tension. It is part of a series of television shows designed to bring elementary and middle school students into closer contact with science and technology. Sample experiments use soap film to demonstrate how surface tension causes soap bubbles to form spheres. The video also highlights a Bubble Festival at The Franklin Institute in Philadelphia, where visitors can observe the fancy ways soap bubbles behave. Chemist David Katz explains bubble chemistry and surface tension. A teacher's guide includes step-by-step lesson plans for using each video in the classroom, background information about each video's topic, and a synopsis of each part of the video so teachers can preview content in advance. The guide also contains hands-on activities and follow-up ideas to connect

students' science learning to other curricular areas. The series covers Earth science subjects such as erosion, crystals, water cycle, volcanoes, and life sciences, including animal vision, food chains, mammals, and behavior. The series also addresses physical science concepts such as friction, air, color, electricity, and refraction. It builds scientific investigations and skills such as collecting data, experimenting, and modeling. (Author/RA) ENC-005721

Dr. Dad's pH Cubed: PHantastic Physical PHenomena!

Electromagnetism: Generating Some Interest in Electricity

Grades 3-6
1994

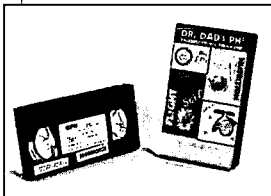
Author: project director,
Ayan Rubin; scriptwriter,
Steve Tomecek

Dr. Dad, a geologist and science educator, takes viewers on a voyage of discovery about electromagnetism. This series of videos, aimed primarily at elementary school girls, is designed to foster a positive attitude toward science. In this video, students learn about Michael Faraday and Thomas Alva Edison and their discoveries about the nature of electricity. Viewers discover the relationship between magnetism and electricity and how electric motors and generators are based on the same principles. The operations manager of a power plant discusses the complexity of a modern power distribution system and why it is critical that supply and demand always balance out. In sample activities, students can build a simple homemade

Ordering Information:
Great Plains National
PO Box 80669
Lincoln, NE 68501-0669
Telephone: (402) 472-2007
Toll-free: (800) 228-4630
Fax: (800) 306-2330
gpn@unl.edu
<http://www.gpn.unl.edu/>

\$29.95 per video
\$5.00 per teacher's guide

Funding: Joe W. and
Dorothy Dorsett Brown
Foundation



generator and illustrate how to build an electro-magnet. A teacher's guide discusses the historical development of the concepts and some of the modern-day technological applications. Also included are suggestions for student activities before and after viewing the tape. Suggestions are given for activities that promote awareness of the contributions different cultures and/or ethnic groups have made to the field. Other suggestions include activities that link to other curriculum, such as math, language arts, and social studies. Short biographies are given of the scientists or inventors mentioned in the series. (Author/RA) ENC-005728

Dr. Dad's pH Cubed: PHantastic PHysical PHenomena!
Optics: Beginning to See the Light

Grades 3-6
1994

Author: project director,
Ayan Rubin; scriptwriter,
Steve Tomecek

Ordering Information:
Great Plains National
PO Box 80669
Lincoln, NE 68501-0669
Telephone: (402) 472-2007
Toll-free: (800) 228-4630
Fax: (800) 306-2330
gpn@unl.edu
<http://www.gpn.unl.edu/>

\$29.95 per video
\$5.00 per teacher's guide

In this video, part of the series described in the preceding record, Dr. Dad takes viewers on a learning journey about light. Students learn about Sir Isaac Newton and Caroline Herschel, discover how a beam of light can be bent, and find out why the curve of a lens changes light's focal point. The show also features an eye examination using a multiple lens phoropter, and students learn about vision therapy using prism glasses and a strobe light. Students also experiment with both prisms and Fresnel lenses to discover how each lens changes the light; and learn how different lenses have different uses. (Author/RA) ENC-005685

A r o u n d t h e
COMPUTER

CURRICULUM RESOURCES

The Factory Deluxe: Strategies in Problem Solving

Grades 4-8
1998

Author: Paul Kronmeyer,
Jennabeth Bogard, Jennifer
Simon, Joe Summerhays,
John Mullaney, and Frank
Migliorelli

Ordering Information:
Sunburst Communications, Inc.
101 Castleton Street
PO Box 100
Pleasantville, NY 10570
Telephone: (914) 747-3310
Toll-free: (800) 321-7511
Fax: (914) 747-4109
service@nysunburst.com
<http://www.sunburstonline.com/>



The five factory-based activities on this CD-ROM are designed to help students expand their problem-solving strategies in geometry, sequencing, and spatial sense. Players learn how to use three types of machines in an assembly line setting: one that places punch marks and stripes on a geometric shape, one that cuts away part of a shape, and one that rotates a shape. In the activities, individual students experiment with researching, designing, and building products using different combinations of the machines. Then, in the shipping phase of the program, students use spatial ability to place orders in the

\$68.95 per hybrid CD-ROM

Note: Contact publisher for
system requirements.

properly shaped crate. In the delivery phase, students use area formulas, estimation, and computation as they play a strategy game to be the first to deliver their product. A special feature of the software is a journal option that allows students to save pictures of selected products and to record observations. Teachers can customize software to meet students' needs and keep records on their progress. The software includes a teacher's guide with detailed information about the program and overviews of the activities. (Author/JRS) ENC-011765

The Graph Club with Fizz & Martina

Grades K-4
1995

Author: Peggy Healy
Stearns; program graphics
and icons, Robert Thibeault

This software program teaches students to use graphs to communicate information, answer questions, and solve problems. The goal is to help them make the transition from graphing with manipulatives to graphing in the abstract. Another aim is to teach students the relationship between different representations of the same data, such as a picture graph, bar graph, and table. The pro-

Ordering Information:
Tom Snyder Productions, Inc.
80 Coolidge Hill Rd
Watertown, MA 02172-2817
Toll-free: (800) 342-0236
Fax: (617) 926-6222
<http://www.teachtsp.com/>

\$99.95 per hybrid CD-ROM
Order # GRT-A

Note: Contact publisher for system requirements.

Standards: NCTM
Curriculum and Evaluation
Standards (1989)

gram encourages cooperative learning, problem solving, and cross-curricular integration. Sample graphs are included for exploring and/or matching. Five modes of operation are available to help students collect information, answer questions, make decisions, and solve problems. The Explore mode generates a pair of graphs in an open-ended environment, while the Match mode generates a random graph and challenges students to create a different type of graph to represent the same data. Using the Create mode, students enter collected data for graphing. The Guess mode encourages critical thinking and helps students understand that there are often many good answers to a question. A teacher's guide is included. (Author/LDR) ENC-004945

Disney's MathQuest with Aladdin

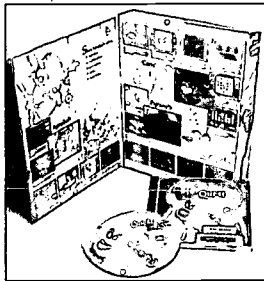
Grades 1-3
1997

Author: Disney Interactive

Ordering Information:
Cuisenaire
PO Box 5026
White Plains, NY 10602-5026
Toll-free: (800) 237-0338
Fax: (800) 551-7637
<http://www.cuisenaire.com/>

\$34.95 per hybrid CD-ROM
Order # MB801-060033

Note: Contact publisher for system requirements.



Using colorful animated graphics, this CD-ROM presents an interactive adventure designed to build basic math skills as students tackle math challenges in the land of Aladdin. The goal of the adventure is to rescue Jasmine, save Aladdin, and find the hidden pieces of the magic lamp. With help and encouragement from Aladdin movie characters, students journey through an eastern bazaar while exploring 18 problem-solving challenges that involve computation, patterns, estimation, and logical reasoning. Offered at three skill levels, these games include mosaics to complete by using line symmetry and geometric shapes, and logic games

that require the discovery of patterns. Each user can save a record of his or her games and rescues in an individual passport that can be called up and added to at the end of each game. Completion certificates can be printed. (Author/JRS) ENC-012236

Mighty Math Number Heroes

Grades 3-5
1996

Author: executive producer,
Donna Stanger

The four activities on this CD invite children to master mathematical concepts. The *Mighty Math* series provides a guided environment in which children engage in both directed and self-directed activities on topics found in most state and district curriculum guides. On this CD, the activity called Fraction Fireworks invites children to make fireworks displays by identifying, comparing and ordering, and computing decimal and common

Ordering Information:
Edmark Corporation
PO Box 97021
Redmond, WA 98073-9721
Toll-free: (800) 362-2890
Fax: (425) 556-8430
edmarkteam@edmark.com
<http://www.edmark.com/>

\$29.95 per CD-ROM and
teacher's guide
Order # 702-1076

Note: Contact publisher for system requirements.

fractions. In Geocomputer, users explore the concepts of area, perimeter, congruence, and tessellation and identify geometric figures in a geoboard environment. Quizzo gives children the chance to compete against a computer-generated opponent to identify numbers and shapes and complete sequences and analogies. The software praises students for correct answers, gives appropriate feedback for incorrect answers, and allows children to continue to work on problems until they arrive at correct answers. An Adult Options section allows parents or teachers to modify settings. Also available is a teacher's guide with start-up directions and reproducible masters for classroom activities. (Author/GMM) ENC-004613

Boxer Introductory Algebra

Grades 5-12
1997

Author: Lea Marshall, Kim Mattingly, and Corey Brady; program creator and engineer, Colin Prepiscus

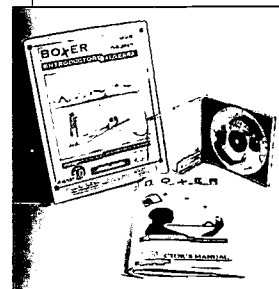
Ordering Information:
Boxer Learning, Inc.
105 West Main Street
Charlottesville, VA 22902
Toll-free: (800) 736-2824
Telephone: (804) 977-5900
Fax: (804) 977-6484
hello@boxerlearning.com

\$49.98 per CD-ROM
(Windows)

Note: Contact publisher for additional ordering options and system requirements.

Standards: NCTM
Curriculum and
Evaluation Standards
(1989)

Using readings, pictures, and animation to engage as many of the user's senses as possible, this CD-ROM tutorial covers the concepts of pre-algebra and beginning algebra in a visual, interactive environment. Detailed explanations are given of each concept, immediately followed by questions applying the concepts. Real-world problems are used when possible to complement the lessons. Students can use an animated number line graph to view operations such as adding a negative two or subtracting a negative three; stretching or shrinking this graph's arrow can also be used to illustrate different algebraic expressions. An on-demand calculator provides support



for use at home or school. The entire program includes more than 297 practice problems and 300 test questions. The program takes approximately 40 hours to complete. An instructor's manual provides

installation tips, lesson summaries, and answer keys. An Internet site is maintained to keep the user informed about other questions and products. (Author/LDR) ENC-010925

Blaster Series

Math Blaster Mystery: The Great Brain Robbery

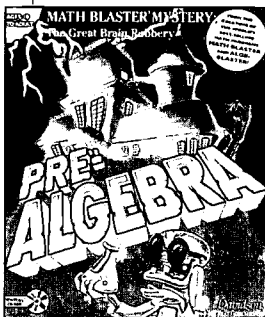
Grades 5-9
1994

Author: Developed by Jan Davidson and John Sosoka; programmers, Doyle Bare and Eric Laun

Ordering Information:
Davidson & Associates, Inc.
PO Box 2961
Torrance, CA 90503
Toll-free: (800) 545-7677
Fax: (310) 793-0603
<http://www.davd.com/>

\$44.95 per CD-ROM
Order # 2733

Note: Contact publisher for system requirements.



While experiencing adventures and intrigue in Dr. Dabble's mysterious mansion, students build upon basic math, logic, and problem-solving skills that will prepare them for algebra. The object is to locate Dr. Dabble's brain, which he has hidden in his laboratory. To carry out this mission, students must explore the rooms in the house, looking for creatures that hand out coins, which they can use to play three math machines. If they outsmart the machines, they earn puzzle pieces which, taken together, provide the key to the lab. The three machines include: Equation Maker, Kitchen

Comparisons, and Number Guesser. Equation Maker challenges students to complete equations; correct answers remove a brick from a wall to display a puzzle piece. In Kitchen Comparisons, students add ingredients to monster stew. The Number Guesser provides practice in working with integers. Students may use the online blueprint to navigate their way around the mansion. (EPIE/DEB) ENC-005148

Shape Up!

Grades K-8
1995

Author: Programming, James Kasic and Josh Eisen

Ordering Information:
Sunburst Communications, Inc.
101 Castleton Street
PO Box 100
Pleasantville, NY 10570
Telephone: (914) 747-3310
Toll-free: (800) 321-7511
Fax: (914) 747-4109
service@nysunburst.com
<http://www.sunburstonline.com/>

\$89.95 per software package
(Mac)

Note: Contact publisher for system requirements.

On this geometric playground, students manipulate, sort, measure, rotate, modify, and experiment with standard and customized shapes. The program contains five sections: Pattern Block World, Tangram World, 2D World, Plato's World, and 3D World. In Pattern Block World the blocks have congruent corresponding sides and angle measures that are integral multiples of 30 degrees. Tangram World is based on a game involving seven pieces cut from a square. 2D World consists of a circle and five regular polygons: a triangle, a square, a pentagon, a hexagon, and an octagon. Students can make virtually any other two-dimensional shape, copy a picture from the collection available, or create an original one. Plato's World contains the five Platonic solids: the tetrahedron, the cube, the octahedron, the dodecahedron, and the icosahedron. Rotational tools allow students to rotate a polyhedron around any one of three axes. 3D World consists of two sets of two-dimensional figures and one set of three-dimensional figures. Each section of the program includes a warm-up, explorations and experimentations with the concepts, instructional notes, follow-up activities, and extension activities. (EPIE/RMK) ENC-005158

Tabletop Jr.

Grades 3-6
1995

Author: TERC, Inc.; project director, Chris Hancock

Ordering Information:
Broderbund Software, Inc.
500 Redwood Boulevard
Novato, CA 94948
Telephone: (415) 382-4400
Toll-free: (800) 521-6263
Fax: (415) 382-3030
<http://www.broderbund.com/>

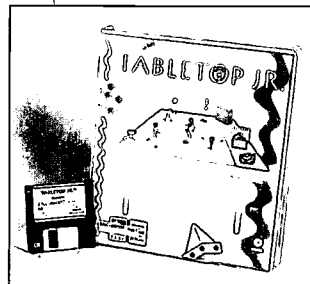
\$99.95 per software package
(Mac/Windows)

Note: Contact publisher for system requirements.

Standards: NCTM Curriculum and Evaluation Standards (1989)

Funding: Jostens Learning Corporation; Broderbund Software, Inc.; National Science Foundation

Tabletop Jr. introduces students to basic math concepts, including data visualization, grouping, sorting, graphing, interpreting data, and logical reasoning. Students apply these concepts as they use their imaginations to create unusual creatures and objects. For instance, students may create the Snoods, characters whose variables are their physical characteristics (type of hair, eyes, nose, feet). Students may also create pizzas, using any combination of toppings to learn sorting and classifying skills. Snoods, pizzas, or other objects can be sorted in seven ways: free form, bunched by attributes, stacked by attributes, axes (scatter plot and cross tab graphs), loops (Venn diagrams), linked by their like characteristics (chains), or in grid formation



(tiling). The teacher's manual includes lesson plans that may function as a single lesson or as part of open-ended investigations. It also includes more than 50 illustrated challenge cards of varying difficulty, each with a game or puzzle. The program is designed to support NCTM standards and may be used to develop estimation skills, number sense and number operations, spatial sense, and fractions and decimals. (EPIE/RMK) ENC-005157

The Logic Box: Software for All Ages

Grade K and up
1993

Author: ScotiaCom Systems

Ordering Information:
PC Resources
11621 Hunters Green Court
Reston, VA 22091
Telephone: (703) 860-1100
Toll-free: (800) 933-6284
Fax: (703) 860-4529
pcoresources@restonusa.com

\$29.95 per software package

Note: Specify English, French, or Spanish. Special educator prices available. Contact publisher for system requirements.

Designed to develop problem solving, logic, and critical thinking skills, this game is played with eight objects and three operations. The eight objects can be words, numbers, pictures, or shapes, and represent all possible combinations of three attributes. For example, if the objects are plane figures, the attributes could be shape (circle or square), color (red or blue), and size (small or large). Objects are moved in and out of a box using the three operations of adding an object, keeping an object, and exchanging objects. Players select one attribute first, such as circle, and then apply an operation to all objects with that attribute. The objective of the game is to use the fewest steps possible to move a selected set of objects into the box, leaving all others outside of it. Problems of varying degrees of difficulty can be selected. Suggestions for classroom use and for extending the applications of this program are also included. (Author/DDD) ENC-002732

Thinkin' Science

Grades 1, 2

1997

Author: Edmark Corporation

Ordering Information:

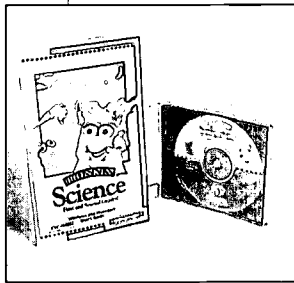
Edmark Corporation
PO Box 97021
Redmond, WA 98073-9721
Toll-free: (800) 362-2890
Fax: (425) 556-8430
edmarkteam@edmark.com
http://www.edmark.com/

\$29.95 per CD-ROM

(consumer edition)
Order # 0922

Note: Contact publisher for system requirements.

Inside the Super Secret Science Station, a radar screen displays signals sent by the Science Scouts: Bobbie, Buddy, and Einstone. Students click on a signal to enter a learning environment and begin a science challenge activity. The five environments each contain a series of progressively difficult activities. In Day and Night, students discover that the Earth spins on an axis and rotates once per day. They can rotate a model of the Earth to see how sunlight and rotation interact to make different times of day and night for specific places on the planet. Fun Physics contains simulated motion experiments in which students solve challenges that involve balls of different weights, adjustable straight and curved ramps, and pendulums. In What Did You See? students learn about animals and seasons through a memory game that sharpens observation, visual discrimination, and perception skills. The tool bar provides hints about the animals' habitats. An additional game, Animal Tracks, shows students how to identify an animal's footprints by studying the number of toes, shape, pattern, and size of the foot.



In the fifth game, the Mystery Cave, students use deductive reasoning to identify an unknown object by using tools that gather data about the smell, texture, color, shape, and weight of the object. As students solve the science challenges, they are rewarded with printable treasures to color, such as animal masks, puzzles, and games. The CD-ROM also contains options that allow parents to customize the program for their children, along with a section that introduces the CD-ROM and provides ideas for doing science with children.

(Author/LCT) ENC-012222

Early Learning Series

Trudy's Time & Place House: Five Exciting Activities Teach Time and Geography

Grades pre-K-12

1995

Author: Tad Wood, John Geilfuss, and Donna Stanger

As students work through the five sections of this CD-ROM, they learn about telling time and geography in a discovery and exploration setting, or in a question and answer mode. For instance, in one of the lessons, Earth Scout, students ride a simulated spacecraft and look down on the Earth below, giving them a sense of the planet's shape and of

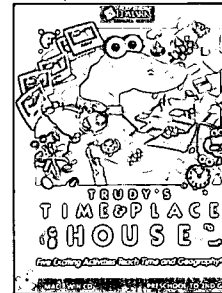
Ordering Information:

Edmark Corporation
PO Box 97021
Redmond, WA 98073-9721
Toll-free: (800) 362-2890
Fax: (425) 556-8430
edmarkteam@edmark.com
http://www.edmark.com/

\$19.95 per CD-ROM

(Mac/Windows)
Order # 604-1083

Note: Contact publisher for additional ordering options and system requirements.



what other countries look like. By pointing and clicking the mouse, students can navigate to other places or even rotate the globe. Using their online camera, users can take pictures of different places around the globe and save them in a photo album. The Jellybean Hunt helps students develop an understanding of direction by directing an ant across a gridded napkin full of jellybeans. Students can go left or right as well as north, south, east, or west. The Symbol Sandbox Overview delineates

the relationship between maps and actual landmarks through an activity in which children construct features in a sandbox by placing symbols on a map. In Calendar Clock, students explore the concept of time by moving backwards and forwards in an animated movie. As the student clicks on one of the time increments—seconds, minutes, days, etc.—the movie progresses

at that respective rate. Finally, Time Twins uses two animated clocks, one digital and one analog, to help students tell time. Each activity is accompanied by teacher guidelines that provide suggestions for achieving maximal use of the program.

(Author/RJK) ENC-004698

3M Learning Software Series; Newton's Apple What's the Secret? Volume 1

Grades 3-12

1994

Author: Executive producer, Richard Hudson; producer, Joy Kopp

Ordering Information:

Layton Marketing Group
1212 Red Fox Road
Arden Hills, MN 55221
Telephone: (800) 219-9022
Fax: (800) 597-0227

\$29.95 per CD-ROM

(Mac/Windows)

Note: Plus \$4.95 shipping and handling

This series of CD-ROMs, based on the TV series *Newton's Apple*, uses a question approach to provide information. The program opens with a mural that represents four major sections the user may explore: bees, sound, the circulatory system, and an amusement park. Each section contains a series of icons that do different things. The icons include Science Try It, Newt (a young Isaac Newton) Notes, and Gadget TV. Under the Science Try It icon, users can take part in an activity that includes a procedure, predicted outcomes, and the scientific principles that explain the outcome. In Newt Notes are science factoids about the various topics. Gadget TV presents QuickTime movies about the topic section. For example movies of millipedes, spider webs, insects, and Africanized bees are featured in the bee section. Another section, the Doctor's Office, provides answers to questions such as what causes high blood pressure and why roller coasters make people sick. (Author/DEB) ENC-004973

3M Learning Software Series; Newton's Apple

What's the Secret? Volume 2

Grades 3-12

1994

Author: executive producer,
Richard Hudson; producer,
Joy Kopp

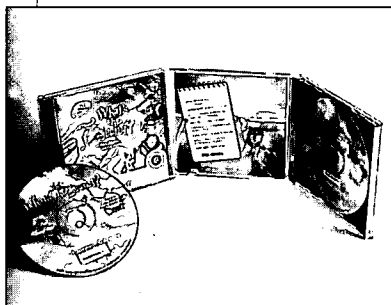
Ordering Information:

Layton Marketing Group
1212 Red Fox Road
Arden Hills, MN 55221
Telephone: (800) 219-9022
Fax: (800) 597-0227

\$29.95 per CD-ROM
(Mac/Windows)

Note: Plus \$4.95 shipping and handling.
Contact publisher for system requirements.

This companion volume to the one described on page 43 contains four major sections the user may explore: flight, glue, the Arctic, and the brain. In the Gadget TV portion of the section on flight, viewers can see movies about spinning, wings, helicopter blades, helicopter controls, and torque. Clicking on the clock brings up timelines for the history of the various sections. In the doctor's office section, students can find answers to questions such as what causes people to shiver and how a doctor fixes a broken tooth. (Author/DEB) ENC-004974



Eyewitness

Eyewitness Children's Encyclopedia

Grades 2-7

1997

Ordering Information:

DK Publishing, Inc.
1224 Heil Quaker Boulevard
La Vergne, TN 37086-7001
Toll-free: (888) 342-5357
Fax: (800) 774-6733
<http://www.dk.com>

\$39.95 per CD-ROM
(Mac/Windows)

Note: Contact publisher about additional ordering options and system requirements.

This interactive reference encyclopedia is designed to stimulate natural curiosity and to challenge children to learn more about the world around them. It contains 40 video sequences, 90 animations and audiovisual sequences, and more than 600,000 words of text created specifically for this encyclopedia. Children explore three-dimensional environments through a spaceship or navigator; they can choose from settings such as the rain forest, the city, and outer space. The atlas button on the navigator's control panel yields facts about every country of the world, details about the lives of children from all over the world, and tours of the world's cities. The viewer can also investigate topics under the headings of culture, nature, history, science, and geography. For each topic there are numerous subheadings leading to text information, illustrations, animations, and references to related topics. Sample investigations include the growth of fungus, human hearing, the mechanics of simple machines, and a complete tour of the Taj Mahal. Surrounding the central control panel are options that include quizzes, key word definitions, biographical information, and a link to the Eyewitness Web site. (Author/JRS) ENC-011890

Eyewitness

Eyewitness Encyclopedia of Nature: The Essential Multimedia Reference Guide to the Natural World

Grades K-12

1995

Ordering Information:

DK Publishing, Inc.
1224 Heil Quaker Boulevard
La Vergne, TN 37086-7001
Toll-free: (888) 342-5357
Fax: (800) 774-6733
<http://www.dk.com/>

\$39.95 per CD-ROM

Note: Contact publisher for system requirements.

Colorful pictures, video sequences, sound clips, and animations illustrate different subjects in life and Earth sciences. The CD covers the world's major habitats, such as tundra, deserts, forests, wetlands, and rain forests. It also discusses the Earth's many plant and animal inhabitants, including amphibians, reptiles, birds, insects, invertebrates, and fungi. Sections on climate, microscopic life, prehistoric life, and evolution are included. A timeline chart illustrates the history of life. The program addresses ecological concepts such as biosphere, energy flow, and the food chain. It also deals with a variety of environmental issues such as pollution, global warming, endangered wildlife, and threatened habitats. (Author/RA) ENC-003337

Eyewitness

Eyewitness Encyclopedia of Space and the Universe

Grades K-12

1996

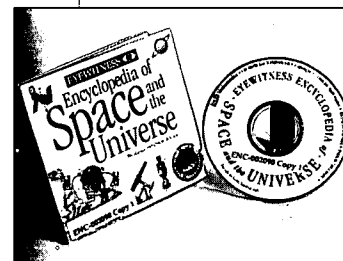
Ordering Information:

DK Publishing, Inc.
1224 Heil Quaker Boulevard
La Vergne, TN 37086-7001
Toll-free: (888) 342-5357
Fax: (800) 774-6733
<http://www.dk.com/>

\$39.95 per CD-ROM

Note: Contact publisher for system requirements.

This CD-ROM encyclopedia and reference guide covers astronomy, space exploration, and the cosmos. It deals with the planets, galaxies, astronauts, spacecrafts, and satellites. There is a virtual observatory and information on ancient observatories, early astrophysics, and early astronomers and their equipment. Users can also "tour" the universe, accessing in-depth information and images of the solar system. Quizmaster is a multiple-choice game students can play, and they can read a reference encyclopedia of famous astronomers, astronauts and scientists, including Copernicus, Buzz Aldrin, and Albert Einstein. Full-color videos, maps, and a gallery of solar system images are also available. (Author/FEB) ENC-002090



Eyewitness Virtual Reality
Dinosaur Hunter

Grades K-12
1996
Author: Dorling Kindersley

Ordering Information:
DK Publishing, Inc.
1224 Heil Quaker Blvd
La Vergne, TN 37086-7001
Toll-free: (888) 342-5357
Fax: (800) 774-6733
<http://www.dk.com/>

\$29.95 per CD-ROM

Note: Contact publisher for system requirements.

This virtual museum tour uses images, animations, video, and sound to present the topic of dinosaurs. In the arena, visitors can learn about the anatomy and behavior of dinosaurs. The East Room contains wall maps and landscapes that recreate the world of the dinosaur as it was between 250 million and 65 million years ago. The West Room is a multilevel dinosaur excavation site where visitors go underground to hunt for dinosaur fossils. Using the clues provided, they complete a skeleton, bring the dinosaur back to life, and release it into the museum. In the Outer Corridor is a timeline that displays the evolutionary relationships of such major dinosaurs as Velociraptor, Troodon, and Gigantosaurus. Visitors can choose to view four museum tours: an introductory tour, How Dinosaurs Lived, How Dinosaurs Evolved, and Extraordinary Dinosaurs. Users can also browse the museum and save exhibits to create their own tour. Additional features include a glossary, navigator, subject and video index, and a museum store that allows visitors to download images, sounds, and stationery to their hard drives. The disc also contains a link to Dorling Kindersley's Internet site for additional information. (Author/LCT) ENC-004652

Eyewitness Virtual Reality
Earth Quest

Grade 4 and up
1997

Ordering Information:
DK Publishing, Inc.
1224 Heil Quaker Boulevard
La Vergne, TN 37086-7001
Toll-free: (888) 342-5357
Fax: (800) 774-6733
<http://www.dk.com/>

\$29.95 per CD-ROM
(Mac/Windows)

Note: Contact publisher for system requirements.

Part of the series described above, this CD tours a museum dedicated to geology and Earth science. The Earth Gallery features more than 200 rock, mineral, and gem samples. Each sample is accompanied by descriptive text and a table that summarizes properties such as hardness, acid, and crystalline structure. The North Room contains three consoles related to mining, which provide general information, maps detailing the distribution of the world's minerals, and four QuickTime videos. The panoramic exhibit in the West Room describes how various landscape features developed. The Violent Earth exhibit in the East Room features maps and videos about volcanoes and earthquakes. An accelerated clock allows visitors to witness events in nature that actually take place over vast expanses of time. Also included are a glossary, a navigator, and a subject and video index. A museum store contains images, sounds, and stationery that viewers may download to their hard drives. A hotlink sends users to DK's Internet site, where additional information is available. (Author/LCT) ENC-010205

The Archaeological Detective

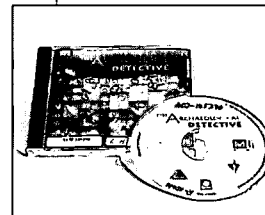
Grades 8-12
1997
Author: producers, Ginette Cloutier, Bruno Legare; director, Annick Hernandez

Ordering Information:
Micro-Intel
1200 Papineau Avenue,
Suite 301
Montreal, CANADA
QC H2K 4R5
Toll-free: (800) 530-8789
Fax: (514) 530-8789
<http://www.micro-intel.com>

\$45.00 per CD-ROM
(Mac and Windows)

Note: Available in lab packs. Contact publisher for system requirements.

A skeleton has been discovered under the old stones of Montreal, and this CD-ROM gives students the chance to try their hand at archaeological detective work. The mission is to determine the sex, age, size, and religion of the person whose decomposing bones were unearthed at the Pointe-a-Calliere excavation site. The clues are found in historical documents, plans, and maps, as well as consultations with experts after collecting data on the remains. Video sequences show archaeologists at work, engaged in activities such as comparing bones of males and females. Additional resources include photographs, narrative sequences, and a glossary of terms. (SSD/Author) ENC-010858



SimEarth

Grade 5 and up
1996
Author: Maxis, Will Wright, and Michael Bremer

Ordering Information:
Electronic Arts
1450 Fashion Island
Boulevard
San Mateo, CA 94404
Telephone: (650) 571-7171
<http://www.ea.com/>

\$14.95 per CD-ROM

Note: Contact publisher for system requirements.

Students can try their hand at creating worlds, learning the concepts of ecology, evolution, and Earth science as they do it. This CD-ROM has a tutorial that teaches the basic rules of the game and explains its various functions, such as creating life and adjusting biomes. Players control conditions such as the mixture of gases in the air, the rate of continental drift, and the amount of solar energy. The game may be started at many points in Earth's history—from a bare planet to the dawn of civilization—and users can keep track of the geosphere, the hydrosphere, the atmosphere, and the biosphere. Players may also choose the challenge of terraforming another planet. Students build their skills as they advance through the program's levels of difficulty. Random events such as meteors striking the planet and hurricanes add an extra degree of uncertainty. These events may be turned off in the lower levels. Progress can be saved and the game played over several sessions. (SSD) ENC-012400



Players may also choose the challenge of terraforming another planet. Students build their skills as they advance through the program's levels of difficulty. Random events such as meteors striking the planet and hurricanes add an extra degree of uncertainty. These events may be turned off in the lower levels. Progress can be saved and the game played over several sessions. (SSD) ENC-012400

Schoolhouse Rock! Math Rock

Grades 1-5
1996

Author: Technical director,
Lee Powell; executive pro-
ducer, Lindsay Gupton

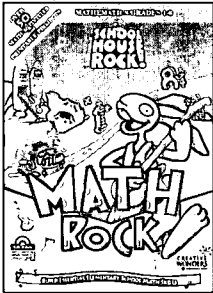
Ordering Information:
Creative Wonders
PO 629000
El Dorado Hills, CA 95762
Toll-free: (800) 505-6133
Fax: (800) 582-8000
cwsupport@cwonders.com
<http://www.cwonders.com/>

\$24.95 per CD-ROM
(Mac/Windows)
\$24.95 per teacher's guide

Note: Contact publisher for
system requirements.

Standards: NCTM
Curriculum and Evaluation
Standards (1989)

Combining rock-and-roll math videos with eight interactive math games, this CD-ROM gives students the chance to participate in a multiplication race, create geometrical shapes, and practice sequences and patterns. Each activity can be played at five skill levels, depending on the grade level of the players. The program targets a range of mathematical skills, from the basic operations of arithmetic and problem solving to the more complex skills of set identification, geometry, sequencing, and strategy. Players travel around Funky Numberland helping Lucky Seven Sampson gather the members of the Funky Numberland Band. To collect a band member, a player must win the math activity three times at one skill level. The game My Hero Zero teaches place value, powers of ten, and strategic planning as the player seeks to fill three rockets with as many rocks as possible without exceeding each ship's maximum payload. In Water Balloon Darts, students use a slingshot to launch three water balloons at number values on a dart board. They have to attain a given sum by working



within restricted parameters, such as using the operators of greater or less than, using only odd numbers, or being required to multiply by two. The game Figure Eight Skating requires students to plan and execute a skater's routine so that it forms a specified geometric shape. The Parent's Corner contains operating instructions, game features, and hints. A printable progress report shows completed student activities and the highest level attempted. (Author/LDR) ENC-008722

such as a nutrition scavenger hunt and a game in which they have five dollars to spend on healthy snacks. The teacher's page features a downloadable guide with an overview of the Web site and classroom activities to complement the online activities. Also included are opportunities for parents to become involved in their child's learning activities. Winner, ENC Digital Dozen, January 1998. (Author/LCT) ENC-011161

KIDLINK: KIDPROJ

<http://www.kidlink.org/KIDPROJ/>

Grades 1-9

The Kidlink Society is a nonprofit organization registered in Norway that encourages students from all over the world to communicate with one another and collaborate on solving world problems. This site, available in 10 languages and 100 countries, offers global networking opportunities for students. It has reached more than 100,000 students since its founding in 1990. To become a member of this free network, students answer four questions about themselves and their ideas about making the world a better place. The Kidscape and Kidsforum conferences are two forums for e-mail dialogue, both as individual keypals and for group discussion on a specific monthly topic. A teacher conference lets teachers share experiences about using Kidlink to enhance their curriculum. (Author/JRS) ENC-011806

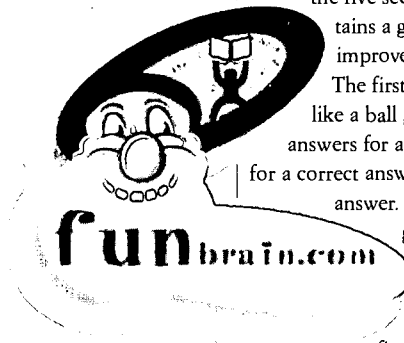
KIDPROJ

Funbrain.com: Where Kids Get Power

<http://www.funbrain.com/index.html>

Grades K-4

This Web site offers a fun way for elementary students to practice important learning skills. Each of the five sections of this interactive site contains a game designed to help students improve their math, spelling, or writing. The first section, Math Baseball, is played like a ball game where the batter finds answers for arithmetic problems, scores a hit for a correct answer, and gets an out for a wrong answer. Change Maker is a cash register game designed to help students learn to make change. There is a matching game to test memory, a spelling game for students to find and correct the misspelled word from a group of four words, and Wacky Tales, where students type in examples of different parts of speech and the computer makes a story with them. Winner, ENC Digital Dozen, April 1998. (JRS) ENC-011932



INTERNET SITES FOR STUDENTS

Kids Food Cyberclub

<http://www.kidsfood.org/>

Grades 3-5

This award-winning nutrition education site contains classroom activities to help students learn about food and nutrition and their relationship to health. The parents' section provides general information about the program and invites parents' questions and feedback. The student pages contain interactive quizzes and games about nutrition,

The Black Hole Gang

<http://www.blackholegang.com/>

Grades K-8



The Black Hole Gang, a group of four kids (Rosa, Wei Ling, Matt, and A.J.) has formed their own science club complete with a special clubhouse. At their site, each member is represented by a cartoon portrait; visitors click on each portrait to go to that kid's corner of the clubhouse. In Rosa's corner, for example, visitors will find a periodic table of the elements, a picture of Einstein, and a chess board. The club botanist, A.J. also likes haiku and architecture; his corner contains plants, a microscope, a variety of simple machines. Matt is interested in Earth and space science, and Wei Ling's corner contains a variety of animals and aquaria. Each item depicted is a link to additional information, related sites, and a bibliography of children's books. Winner, ENC Digital Dozen, June 1998. (Author/LCT) ENC-012125

Manipula Math with JAVA

<http://www.ies.co.jp/math/java/iesjava.html-ssi>

Grades 5-12

Sophisticated mathematical concepts can be explored using the interactive animation at this Web site. The site is designed for middle school geometry students, high school students, college students, and all who are interested in math. The interactive programs present a problem with opportunities for the student to do structured exploration. Students can manipulate relationships between variables presented in the problem, allowing them to investigate the meaning of the Pythagorean Theorem or find the sum of the outer angles of a polygon. Students can generate, rotate, and transform three-dimensional figures. Topics include geometry, trigonometry, and calculus. Winner, ENC Digital Dozen, May 1998. (JRS) ENC-011230

Mancala

<http://imagiware.com/mancala.cgi>

Grades 5-12

This computer version of the ancient game Mancala, also known as Kalaha, depicts a game board with 12 playing pits, each containing three seeds. Each seed in the pit is then placed, one at a time, into successive pits, moving counter-clockwise around the board. Seeds placed in a scoring pit are points for that player. The game ends when all pits on one side of the board are empty. The players' names are recorded on the Mancala Scoreboard if they perform well enough. There are two difficulty levels available as well as a hint button that suggests moves. Winner, ENC Digital Dozen (May 1995). (Author/SXA) ENC-004050

A r o u n d t h e W O R K B E N C H

CURRICULUM RESOURCES

Science & Technology

Electric Bell

Grades 4-8

1994

Students can use this kit to build a working electric bell and use it to experiment with electromagnetism. Each kit in the series develops hands-on experience through building a particular tool that can then be used in experiments that explore science concepts. The materials and instructions in this kit help students explore electromagnetics as

Ordering Information:

Learning Resources
380 North Fairway Drive
Vernon Hills, IL 60061
Telephone: (847) 573-8406
Toll-free: (800) 222-3909
Fax: (800) 222-0249

\$14.95 per kit
Order # LER 2020

well as currents, circuits, and switches. The instruction booklet contains an illustrated description of each kit component, assembly directions for the electromagnet and switch, and six experiments. In sample experiments, students use the materials to make a compass and to check the polarity of an electromagnet. Each experiment includes an illustrated procedure and scientific explanations. (Author/LCT) ENC-013063

BEST COPY AVAILABLE

*K'NEX in the Classroom***Solar Power 10 Model Set****Grades K-12**
1997**Ordering Information:**
K'NEX Educational Division
2990 Bergey Road
PO Box 700
Hatfield, PA 19440-0700
Telephone: (215) 997-7722
<http://www.knex.com/>**\$56.00** per Solar 10 set
Order # KNX 15201Note: Includes
K'NEX pieces (226),
instruction booklet,
and one solar panel
with solar motor and
12 inch power cord.

Students can use the materials and instructions in this kit to build 10 solar-powered models that include a windmill, a dragster, a merry-go-round, and an oil pump. The instruction book, written in English, Spanish, and French, is illustrated with color photographs that show users how to assemble the solar panel and motor jack. Color-coded diagrams depict the construction of each model. Also available is a classroom guide with extension activities and ideas for science fair projects. This book is written to help parents and teachers inform students about the various ways that renewable energy and energy efficiency can be used to contribute to our society.

Each project idea includes a description of available technology, questions for research, and hints for designing experiments. Topics include photosynthesis and biofuels, wind energy and geothermal energy,

and hydropower and superconductors. An annotated bibliography of books, films, and software packages is included, as well as references to publishers, science competitions, and energy-related organizations. (Author/LCT) ENC-012295

*K'NEX in the Classroom***Simple Machines****Grades 3-8**
1997**Ordering Information:**
K'NEX Educational Division
2990 Bergey Road
PO Box 700
Hatfield, PA 19440-0700
Toll-free: (888) 222-5639
abcknex@voicenet.com
<http://www.knex.com/>**\$299.00** per deluxe kit
Order # 79520

This deluxe set includes lesson plans, materials, and instructions for all five Simple Machines sets (levers, pulleys, gears, wheels, and inclined planes), plus the instructions and extra materials to build the Big Ball Factory, a Rube Goldberg device that shows levers, gears, and pulleys in action. Each simple machine set is accompanied by a set of activity cards and an educator's guide that contains general instructions, background information, and teacher's notes for approximately ten activities. The illustrated activity cards show students how to build each model. As students build the models, they experiment, compare, and contrast machine function, measure forces with a K'NEX rubber band scale, and compute mechanical advantage.

Standards: National Science Education Standards (NSES) (December 1995); Alaska Math/Science Framework (1996)

With the Wheel and Axle set, students determine the purpose, function, and parts of the wheel and axle system. The Lever set helps students to build three classes of levers and explore the relationship between effort, fulcrum, and resistance. With the Pulley set, students multiply and change the direction of available force with the use of a pulley system and measure and compare mechanical advantage. Students use the Inclined Plane set to learn how mechanical advantage is affected by angles as they experiment with screws, wedges, and inclined planes. The Gear set contains an electric motor that allows students to experiment with speed and force and explore how gear size and direction impact work. For each activity, the teacher's notes provide a photograph that depicts how the machine is used in a common object; a description of the function of the machine; and suggested modifications for the students to try out. The guide also suggests writing activities.

(Author/LCT) ENC-012297

*LEGO DACTA Early Science & Technology***Early Simple Machines set****Grades K-2**
1994**Author:** Teacher's guide by
Floyd Flack, Linda Tammi**Ordering Information:**
LEGO dacta
55 Main Street, Suite 5100
Enfield, CT 0646
Toll-free: (800) 510-5773
Fax: (860) 429-2569
<http://www.lego.com/dacta/>**\$81.00** per set
Order # 9651**Standards:** Science Framework for California Public Schools (1990); New York Curriculum, Instruction, and Assessment Framework for Mathematics, Science and Technology (Draft, 1994); Texas Science Standards

As children use LEGO building blocks to construct a variety of simple machines, they learn science process skills. The kit contains a teacher's guide, activity cards, and 71 oversized (DUPLO) pieces including gears, wheels, axles, and handles. The guide provides six thematic lesson plans designed to help students relate simple machines to the real world. For example, one activity presents a situation in which two children are excited about flying their new kites, but they want to know if it is windy enough. Students are invited to invent a device to solve this problem. Each lesson refers to



a colorful activity card that presents the situation. The Green Exploration cards introduce the LEGO pieces and how they are used. Yellow Knowledge cards create a context for building by suggesting a theme for the simple machine concept under investigation. Blue Practice cards show students how to build sim-

ple models, and the Red Invention cards present an open-ended problem to solve. (Author/LCT) ENC-012292

Exploratorium Science-at-Home Book

The Science Explorer Out and About: Fantastic Science Experiments Your Family Can Do Anywhere!

Grades 1-9
1997

Author: Pat Murphy, Ellen Klages, Linda Shore, and the staff of the Exploratorium

Ordering Information:

Exploratorium Store
3601 Lyon Street
San Francisco, CA 94123
Telephone: (415) 561-0393
Fax: (415) 353-0481
<http://www.exploratorium.edu/>

\$12.95 per book (paperback)

This collection of family-oriented science experiments can be done at home or outdoors. The Exploratorium, San Francisco's museum of science, art, and human perception, is dedicated to the principle of hands-on and minds-on science learning. This book was written for people who may not know anything about science, but want to have fun exploring the world around them. The experiments are organized into seven chapters that explore mirrors, density, and change; language, sun, and shadows; and building materials and internal structures. In sample activities, children and their parents take apart floppy discs and wind-up toys to see how they work. They also make



towers out of toothpicks and gum drops and use mirrors to make a periscope. In additional activities, families make a miniature lava lamp out of salt and oil, communicate with pictures instead of words, and use shadows to chart the sun's path. For each experiment, the book provides a list of time and material requirements, an illustrated procedure, and scientific explanations. It also indicates which experiments can be done by kids alone or by kids and adults together. Each chapter concludes with ideas for a family field trip with activities that use science in the real world. A bibliography of related children's books is also included. (Author/LCT) ENC-012276

Exploratorium Science-at-Home Book

The Science Explorer: Family Experiments from the World's Favorite Hands-On Science Museum

Grades 1-9
1996

Author: Pat Murphy, Ellen Klages, Linda Shore and the staff of the Exploratorium

Ordering Information:

Exploratorium Store
3601 Lyon Street
San Francisco, CA 94123
Telephone: (415) 561-0393
Fax: (415) 353-0481
<http://www.exploratorium.edu/>

The eight chapters in this book, part of the same series described above, contain experiments that explore light and colors, optical illusions, static electricity, sound, and mixtures. Children and their parents use household materials to blow bubbles, make musical instruments and flying toys, and create shimmering colors and startling sparks. They also mix up a gooey Ooze that is both a solid and a liquid. (Author/LCT) ENC-012267

What If? Mind-Boggling Science Questions for Kids

Grades 3-7
1998

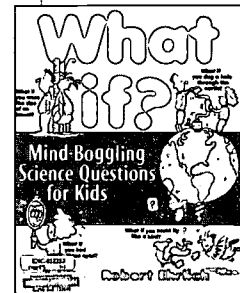
Author: Robert Ehrlich;
illustrated by Ed Morrow

Ordering Information:

John Wiley and Sons, Inc.
One Wiley Drive
Somerset, NJ 08875-1272
Telephone: (908) 469-4400
Toll-free: (800) 225-5945
Fax: (908) 302-230
<http://www.wiley.com/>

\$12.95 per book (paperback)

Written for grades 3-7, this book contains a variety of questions—from serious and scientific to wild and wacky—designed to stimulate children to think about science. Sample questions include: What if the sky got black in the daytime? What if you had three eyes? What if you could travel into the past? Each question is answered with a simple statement, followed by a longer explanation of the science behind the answer. Boxes within the answer provide fun facts, simple experiments to do, and more interesting questions to ask. For



example, in response to the question What if water could flow uphill?, students learn about the effects of gravity, pressure, and hydroelectric energy. The accompanying experiment shows children how to make an upside down waterfall using a siphon.

The book is illustrated with blackline diagrams and cartoons. A glossary is provided. (Author/LCT) ENC-012213

Zap Science

Grades K-12
1997

Author: John Cassidy, Paul Doherty, and Pat Murphy

Ordering Information:

Exploratorium Store
3601 Lyon Street
San Francisco, CA 94123
Telephone: (415) 561-0393
Fax: (415) 353-0481
<http://www.exploratorium.edu/>

\$19.95 per book

This activity book is packaged with objects designed to introduce basic science concepts through humorous stories and multisensory activities. The objects include a pair of polarizing filters, a Zap Tube containing tiny Styrofoam spheres, 3-D glasses, and a mystery Zap Pack. The book is divided into five sections that explore light, pressure, static electricity, optics, and 3-D effects. The first section shows how to use the polarizers to create different visual effects and to visualize stress lines within a plastic fork. Students experiment with a sample of sodium acetate contained in the mystery Zap Pack and examine electron micro-



graphs of the crystalline structures of diamonds and gold. The next section uses soda pop bottles to explore forces, pressure, and free fall. The third section

introduces the concept of the electron and static electricity through activities using the Zap Tube. The vision section shows students how to make magnifying lenses out of gelatin and how to examine a photograph of an image projected onto the human retina. (Author/LCT) ENC-012259

Science in Seconds with Toys: Over 100 Experiments You Can Do in Ten Minutes or Less

Grades 3-6

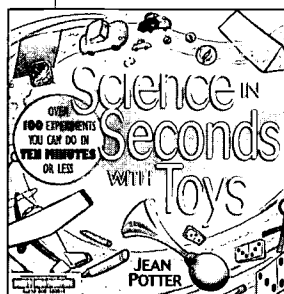
1998

Author: Jean Potter

Ordering Information:

John Wiley and Sons, Inc.
One Wiley Drive
Somerset, NJ 08875-1272
Telephone: (908) 469-4400
Toll-free: (800) 225-5945
Fax: (908) 302-2300
<http://www.wiley.com/>

\$12.95 per book



This book helps parents and children conduct simple science experiments using familiar toys and games. Readers will learn how an Etch-A-Sketch works through static electricity, how adsorption occurs when Silly Putty pulls up comic strips from the newspaper, and how gyroscopic stability makes a football spiral through the air. Additional activities show children how to make their own polymer play "plubber" from borax and glue, explore the forces that keep Frisbees and hula hoops aloft, and use chromatography to separate the pigments in colored markers.

(Author/LCT) ENC-011649

Spy Science: 40 Secret Sleuthing, Code Cracking, Spy Catching Activities for Kids

Grades 5-8

1996

Author: Jim Wiese; illustrations by Ed Shems

Ordering Information:

John Wiley and Sons, Inc.
One Wiley Drive
Somerset, NJ 08875-1272
Telephone: (908) 469-4400
Toll-free: (800) 225-5945
Fax: (908) 302-2300
<http://www.wiley.com/>

\$12.95 per book



Students can use this activity book to learn the history, science, and technology of espionage. The book covers such tricks of the trade as going undercover, mastering Morse code, and building devices that allow would-be spies to see around corners and listen through walls. In other activities, students build a parabolic microphone and an alarm system from simple circuits and use the kinetic energy of a rubber band to make contact with a partner. The book provides instructions for using the Internet to gather information from the

Central Intelligence Agency (CIA), the White House, and other government agencies. Anecdotes illustrate how the work of famous spies, such as Casanova and Robert Baden-Powell, altered the course of history. (Author/LCT) ENC-008849

CURRICULUM RESOURCES

Container Gardening for Kids

Grades pre-K-8

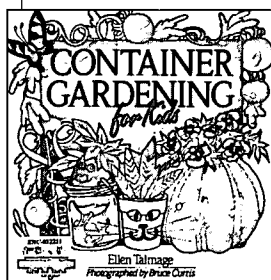
1996

Author: Ellen Talmage; photographs by Bruce Curtis

Ordering Information:

Sterling Publishing Co., Inc.
387 Park Avenue South
New York, NY 10016
Telephone: (212) 532-7160
Toll-free: (800) 367-9692
Fax: (800) 542-7567
<http://www.sterpub.com/>

\$9.95 per book



This book shows students how to grow miniature gardens in a variety of creative containers, from old shoes to recycled car tires. Beginning with a discussion of basic plant care, the book describes how to start plants from seeds, bulbs, and cuttings. Subsequent chapters provide directions and ideas for projects in which students make an herbal flea collar for the family dog and grow salad greens in a piece of PVC pipe. Each activity lists materials and includes illustrated instructions. Additional photos

provide an identification guide to common plants that can be grown in containers. (Author/LCT) ENC-012211

The Children's Kitchen Garden: A Book of Gardening, Cooking, and Learning

Grades K-6

1997

Author: Georgeanne and Ethel Brennan with Marcel Barchechat and the East Bay French-American School; illustrations by Ann Arnold

Ordering Information:

Ten Speed Press
PO Box 7123
Berkeley, CA 94707
Toll-free: (800) 841-2665

\$16.95 per book

A garden project initiated at the East Bay French-American School, in Berkeley, California, became an integral part of the school's curriculum. This book describes the school and the development of the garden project, with examples of garden and classroom activities. A narrative describes organizing a similar educational experience in a home or school garden. Chapter three presents practical, hands-on information to start and maintain a garden for teaching children. An annotated listing of edible plants includes directions for preparing the soil and growing the plants as well as what to look for when the crops are ready to harvest. Chapters four and five provide information for herb gardens and seasonal gardens, with accompanying recipes. The final chapter includes special cooking tips for children. (Author) ENC-011043

Slugs, Bugs, and Salamanders: Discovering Animals in Your Garden

Grades K-8

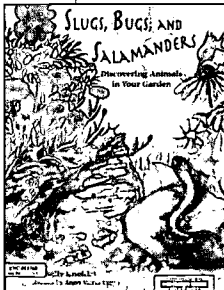
1997

Author: Sally Kneidel; illustrated by Anna-Maria Crum

Ordering Information:

Fulcrum Publishing
Orders Department
350 Indiana Street, Suite 350
Golden, CO 80401-5093
Telephone: (303) 277-1623
Toll-free: (800) 992-2908
Fax: (800) 726-7112
fulcrum@concentric.net
<http://www.fulcrum-resources.com/>

\$15.95 per book
(paperback)



The focus of this book is the insects, birds, amphibians, and other animals found in gardens, including creatures both beneficial and damaging. The book also describes a garden created especially for children, with "playful" vegetables like cherry tomatoes and sugar peas that can be eaten right off the vine. In this garden are "fun" flowers as well, such as snapdragons that bite the air when pinched and sunflowers that yield seeds for munching. Beginning with a discussion of the relationships between plants and animals in the garden community, the book describes producers, consumers, and decomposers as well as plant eaters and predators.

Subsequent chapters talk about soil preparation and describe how to grow plants that will attract butterflies, hummingbirds, and other pollinators. Also included are tips for starting a basic garden journal and organic methods for dealing with pests. Interspersed throughout the book are activities that enable students to identify the parts of insects; learn how parasitic wasps keep hornworms in check; and discover which insects can change colors. (Author/LCT) ENC-011768

Accidental Scientist

The Garden Explored

Grades K-12

1997

Author: Mia Amato with the Exploratorium

Ordering Information:

Exploratorium Store
3601 Lyon Street
San Francisco, CA 94123
Telephone: (415) 561-0393
Fax: (415) 353-0481
<http://www.exploratorium.edu/>

\$12.95 per book (paperback)

Developed for families, this book explores the science of soil and water, of seeds and seasons, and of bugs and roots. The Exploratorium, located in San Francisco, California, is a museum dedicated to science, art, and human perception. Its *Accidental Scientist* series is designed to reveal the hidden science underlying readers' everyday activities. This book contains answers to such questions as Why should you always water plants in the morning? (Answer: the stomata are open) and Why do you prune at a certain time of the year? (Answer: to manipulate plant hormones called auxins).

Additional topics include the vascular nature of plants, nutrient cycles, ecology and habitats, and fooling Mother Nature. The book also includes experiments for home gardens. Readers can create their own hybrids, graft fruit trees, and shape a tree with selective pruning. A resource guide of bibliographic references is included. (Author/LCT) ENC-012277

Math Is Everywhere!

Math in the Garden

Grades K, 1

1994

Author: Laura Mackey; illustrated by N.J. Taylor

Ordering Information:

Evan-Moor Educational Publishers Co.
18 Lower Ragsdale Drive
Monterey, CA 93940-5746
Toll-free: (800) 777-4362
<http://www.evan-moor.com/>

\$6.45 per book

Teachers can use this book to help children apply math concepts and skills to home and school situations. The units include teacher resource pages, student forms for recording information, activity sheets, and patterns. Suggested classroom gardening activities run from simple to involved and provide the structure for practicing many math, process, and social skills. Some of the mathematical skills targeted by this book include patterning, estimation, fractions, and graphing. Students also practice observing, recording, and communicating data. Social skills developed by this book include cooperation, responsibility, and patience. Activities involve growing individual plants, dramatizing related concepts, collecting data on plant care, and maintaining journals. (Author/SXA) ENC-002511

Backyard Scientist

Backyard Scientist: Exploring Earthworms with Me

Grades pre-K-6

1994

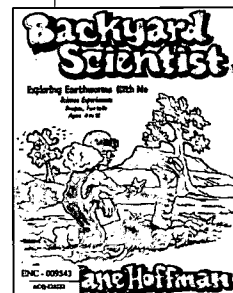
Author: Jane Hoffman; illustrated by Lanny Ostroff

Ordering Information:

Backyard Scientist
PO Box 16966
Irvine, CA 92713
Telephone: (714) 551-2392
Fax: (714) 552-5351
Backyardsci@aol.com

\$10.20 per book

The 19 experiments in this book are designed to help students learn about the positive environmental contributions of earthworms. Books in the *Backyard Scientist* series provide hands-on science experiments for young scientists. Experiments in this book allow students to discover where to find earthworms, how earthworms react to environmental stimuli, and what earthworms eat. The experiments also help students develop skills in observing, categorizing, and inferring. For each experiment,



the book provides a list of household materials needed, step-by-step instructions, questions designed to improve critical thinking skills, and an explanation of the expected results. The text is illustrated with blackline cartoons. (Author/LCT) ENC-009543

*Spectacular Science Projects***Janice VanCleave's Insects and Spiders: Mind-Boggling Experiments You Can Turn into Science Fair Projects****Grades 3-6**

1998

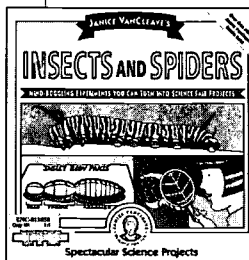
Author: Janice VanCleave

Ordering Information:

John Wiley and Sons, Inc.
One Wiley Drive
Somerset, NJ 08875-1272
Telephone: (908) 469-4400
Toll-free: (800) 225-5945
Fax: (908) 302-2300
<http://www.wiley.com/>

\$10.95 per book

This trade book presents facts about insects and spiders and includes 20 entomology-related experiments, projects, and activities. In sample activities, students catch and identify flying insects and insects that live in the soil; observe the metamorphosis of grasshoppers and beetles; and make a three-dimensional model of the main body parts of an insect. For each activity, the book provides background information, a list of materials, an illustrated procedure, and a scientific explanation of the results. Safety tips and suggestions for sci-



ence fair display boards are also provided, as well as commercial sources for insects, a glossary, and bibliographic references. (Author/LCT) ENC-011650

Parent's Guide to Hooked on Fishing, Not on Drugs**Grades 5-12**

1994

Author: Developed by Dave Case, Sharon Rushton, and Ann Romer with the assistance of Charles Flatter, Marcel Malfregeot, Verdie Abel, and Mark LaBarbera

Ordering Information:

Future Fisherman Foundation
Department 854-0113W
Suite 200
PO Box 94020
Palatine, IL 60094-4020
Telephone: (847) 364-1222

\$1.50 per booklet

Funding: United States
Department of the Interior;
Fish and Wildlife Service;
Sport Fish Restoration Fund

The *Hooked on Fishing* drug education program helps students develop positive life skills, such as self esteem, communication, and relational skills, as they learn about sport fishing, and environmental conservation. This booklet, a parent's guide to the program, promotes fishing as a positive alternative to drugs and gives parents practical information to keep their children drug free. It provides tips for organizing a family fishing trip, an overview of childhood developmental stages, and tips for communicating with children at each stage. (Author/LCT) ENC-012209

Sport Fishing and Aquatic Resources Handbook**Grade K and up**

1991

Author: Bob Schmidt; editor,
Louis R. Jensen

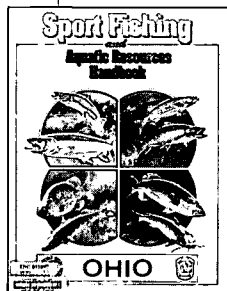
Ordering Information:

Future Fisherman Foundation
Department 854-0113W
Suite 200
PO Box 94020
Palatine, IL 60094-4020
Telephone: (847) 364-1222

\$3.95 per book

Note: Plus 10% shipping
cost. Volume discount
available.

Funding: American
Sportfishing
Association; Future
Fisherman
Foundation



Developed for families by the Future Fisherman Foundation, this book introduces readers to sport fishing as a recreational and educational activity. In addition to helping readers become familiar with fishes and fishing techniques, the book also explains the importance of learning about aquatic resources, fish behavior and habitats, and fishing regulations. Additional chapters discuss safety issues, make recommendations for cleaning, storing, and cooking the catch, and provide a field guide of common fish species. Each chapter concludes with a series of hands-on learning activities to reinforce the main points. Sample activities show readers how to make a first aid kit and keep records of their fishing trips. Simple experiments allow students to explore biodegradable materials,

test water quality, and determine the seasonal preferences of local fish. The book contains black and white line drawings and a glossary. A second book on advanced sport fishing is also available. (Author/LCT) ENC-011897

Everybody's Everywhere Backyard Bird Book**Grades K-12**

1992

Author: the editors of Klutz
Press

Ordering Information:

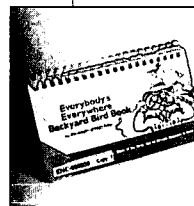
Scott Foresman Addison
Wesley
Klutz Press
2121 Staunton Court
Palo Alto, CA 94306
Telephone: (415) 857-0888
Toll-free: (800) 558-894
Fax: (415) 857-9110

\$11.00 per book

Order # 3101

The 26 birds described in this book, designed to be a beginner's guide, are the lucky winners of the authors' nationwide "Most Likely to Be Seen No Matter Where You Live" contest. The first part of the book provides general information about birds, bird watching, and bird behavior. This section also provides six steps to identifying birds by their location, actions, size, shape, and markings. Instructions are included for using the Audubon Birdcall attached to the book. The second part of the book profiles each bird with a color photograph and a description of its physical characteristics and specific adaptations. The birds described

are grouped by habitat: there are city birds; birds that live in the backyards, parks, and small woods of suburbia; those that are found in open country and farmlands; and birds that can be seen around water. (Author/LCT) ENC-008038



INTERNET SITES FOR FAMILIES

National Geographic Society

<http://www.nationalgeographic.com/main.html>

Grades K-12

This interactive version of the popular *National Geographic* magazine includes a searchable index of the magazines from 1996 to the present as well as National Geographic books, films, and videos. Highlights from the current month's magazine and contests are also available. Each month, National Geographic Online debuts several new features designed to allow visitors to participate in a virtual adventure or discovery. Other opportunities at this site include chatting with photographers, writers, and artists; exchanging ideas with leading scientists; and sending an e-mail postcard to a friend. Winner, ENC Digital Dozen, September 1996. (Author/JMJ) ENC-002156

S & T Test Report: Choosing a Low Cost Telescope

<http://www.skypub.com/testrept/lowcost.html>

Grades K-12

Maintained by *Sky & Telescope* (S&T) magazine, this site contains recommendations to help the novice astronomer choose an inexpensive telescope. The authors tested nine telescopes and rated them on the quality of the optics, ease of operation, and clarity of the user's guide. Specifications for a good, low-cost telescope include: a sturdy mount; an aperture of at least 70 mm (2.75 inches) for refractors, 100 mm (4 inches) for reflectors; a standard 1.25-inch barrel; and a 30 mm or larger finderscope. (Author/LCT) ENC-012327

The Garden Gate

<http://www.prairienet.org/ag/garden/homepage.htm>

Grades K-12

Gardeners and nature lovers alike will find this comprehensive Web site useful, with its links to interesting sites around the world and a growing collection of original materials. Resources are indexed according to subject and medium, such as text, online books, catalogs, and software reviews. Examples of specific links include TeleGarden, an unusual garden at the University of Southern California tended by people from all over the world with a Web-controlled robot. This site also includes the Spider's Web, a seasonal online column that points the user to particularly timely links. Winner, ENC Digital Dozen, June 1996. (Author/LCT) ENC-001892

OneWorld Magazine

<http://www.envirolink.org/oneworld/index.html>

Grade 9 and up

Sponsored by the EnviroLink Network, this site hosts a free electronic publication that focuses on environmental, cultural, and exploration issues around the world. This Web magazine offers illustrated stories and articles designed to entertain and educate readers about the diverse aspects of our world's cultures and environments. From the index, visitors can read articles about Antarctica,

The logo for OneWorld Magazine features the word "OneWorld" in a stylized, bold, serif font. The "O" is significantly larger than the other letters and is partially enclosed by a thick, black horizontal bar that extends across the width of the logo.

deserts, and Ethiopia. The articles about Antarctica present its continental geology, history, and conservation efforts. The deserts section offers a literary field trip to deserts in the American West, the Sahara, and Australia through a selection of articles and fictional works from Tony Hillerman, Philip K. Hitti, and Elizabeth Marshall Thomas. Winner, ENC Digital Dozen, April 1998. (Author/LCT) ENC-011676

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CHILDREN'S LITERATURE

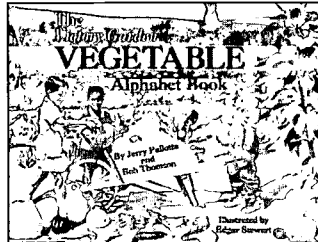
The Victory Garden Vegetable Alphabet Book

Grades pre-K-3
1992

Author: Jerry Pallotta and Bob Thomson; illustrated by Edgar Stewart

Ordering Information:
Charlesbridge Publishing
Toll-free: (800) 225-3214
\$6.95 per book (paperback)
\$15.95 for hardcover

Based on PBS's *Victory Garden* television show, this alphabet book features detailed paintings that depict children in the garden with a variety of familiar and exotic vegetables, such as daikon, peanut, and ultra-girl tomato. Each letter is represented by a full-page spread that includes a picture of the vegetable and a simple explanation of how it grows and tastes. (LCT) ENC-011097



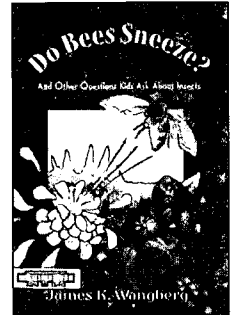
Do Bees Sneeze? And Other Questions Kids Ask About Insects

Grades K-8
1997

Author: James K. Wangberg; illustrations by Ellen Parker

Ordering Information:
Fulcrum Publishing
Toll-free: (800) 992-2908
\$17.95 per book

Written by an entomologist, this book is meant to help parents and other adults who work with children to answer kids' questions about bugs. The book contains the answers to more than 200 frequently asked questions about the physical appearance, body parts and functions, and habitats and behavior of many common insects. Sample questions include: Why do cockroaches eat garbage? How can bugs have so much energy? Do insects go to the bathroom? Each chapter concludes with a series of activities to encourage further investigation. A list of suggested readings is also provided. (Author/LCT) ENC-011767



The Magic School Bus Plants Seeds: A Book About How Living Things Grow

Grades K-6
1995

Author: Patricia Reif; illustrated by John Speirs

Ordering Information:
Scholastic, Inc.
Toll-free: (800) 724-6527
\$2.99 per book (paperback)

Ms. Frizzle's class is growing a beautiful garden, but one of her students, Phoebe, is new and left her flowers back at her old school. The class climbs aboard the magic school bus, which shrinks until it is small enough to go inside one of Phoebe's flowers, where they see nectar, anthers, and pollen. A bee carries the bus to the next flower, where the students see a stigma, egg cells, and seeds. (Author/LCT) ENC-010802



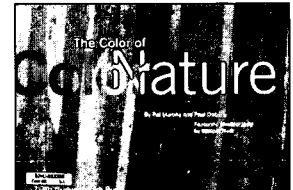
The Color of Nature

Grade K and up
1996

Author: Pat Murphy and Paul Doherty; photography by William Neill

Ordering Information:
The Exploratorium
Telephone: (415) 561-0393
\$22.95 per book (paperback)

This book of photography is full of the brilliant colors that occur in nature. Readers get to see colors that are usually overlooked, such as the iridescent sheen in the wings of a fly. The first chapter explains the chemical nature of pigments, while subsequent chapters illustrate the physics of light and color. William Neill describes his photographic techniques and bibliographic references are provided. (Author/LCT) ENC-012285



It's Pumpkin Time!

Grades pre-K-1
1994

Author: Zoe Hall; illustrated by Shari Halpem

Ordering Information:
Scholastic, Inc.
Toll-free: (800) 724-6527
\$3.95 per book (paperback)
\$13.95 for hardcover

A sister and brother plant and tend their own pumpkin patch so that they will have jack o' lanterns for Halloween. The minimal text and painted paper collages describe how the children prepared the soil, planted the seeds, and watched their pumpkins grow all summer until fall, when they harvested and carved their pumpkins. The book also contains an illustrated summary of how pumpkin seeds sprout and grow underground. (Author/LCT) ENC-010818



Lightning

Grades 3-7
1992

Author: Stephen Kramer; photographs by Warren Faidley

Ordering Information:
Carolrhoda Books, Inc.
Telephone: (612) 332-3344
\$19.95 per book (hardcover)

Dramatic photographs and simple narrative text present a variety of facts about lightning. Beginning with a brief description of thunder storms and lightning, the book goes on to provide a simple description of the atom and how lightning is formed by a sudden blast of electrons. Additional topics include the events that take place when lightning strikes, different types of lightning, and the relationship between clouds, lightning, and thunder. (Author/LCT) ENC-012288



What Makes the Grand Canyon Grand? The World's Most Awe-Inspiring Natural Wonders

Grades 3-6

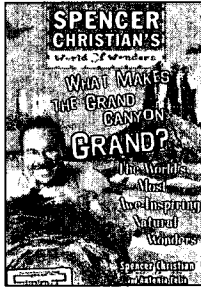
1998

Author: Spencer Christian and Antonia Felix

Ordering Information:

John Wiley and Sons, Inc.
Toll-free: (800) 225-5945
\$12.95 per book

Part of Spencer Christian's World of Wonders series, this book explains how natural forces such as rivers and glaciers created some of the world's most famous natural wonders. Readers will learn how wind and water erosion formed the Grand Canyon and how water seeping through rock forms solution caves such as the Carlsbad Caverns in New Mexico. Additional topics include waterfalls, mountains and volcanoes, and glaciers and icebergs. Each chapter contains hands-on experiments that model the processes discussed in the text. (Author/LCT) ENC-011762



The Dark Zone: Exploring the Secret World of Caves

Grades 3-7

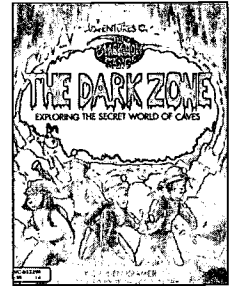
1998

Author: Stephen Kramer; illustrated by Richard Torrey

Ordering Information:

McGraw-Hill
Toll-free: (800) 722-4726
\$10.95 per book (paperback)

The Black Hole Gang, made up of four kids and a dog named Newton, is crazy about science. They hang out in a clubhouse packed with beakers, terrariums, rock collections, and a telescope named Boris. In this story, an urgent e-mail alerts them about a vandalized bat cave that needs to be cleaned up and protected. The kids are soon on their way to a spelunking adventure, where they learn about stalagmites and stalactites, cave fish and salamanders, and erosion and sedimentation. There is also a Web site devoted to the Black Hole Gang—see page 47 of this issue of *Focus*. (Author/LCT) ENC-012290



A Drop of Water: A Book of Science and Wonder

Grades K-8

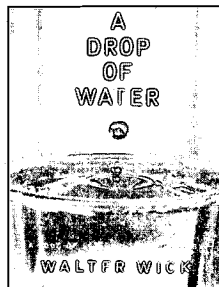
1997

Author: Written and photographed by Walter Wick

Ordering Information:

Scholastic, Inc.
Toll-free: (800) 724-6527
\$16.95 per book

Spectacular photographs use stop action and magnified views to show all the states of water. Readers can examine a drop of water as it falls from a faucet, see a drop as it splashes on a hard surface, and count the points of an actual snowflake. Evaporation, condensation, capillary action, and surface tension are explained, and the last pages describe the simple experiments performed throughout the book so that they may be duplicated at home or in school. (Author/SSD) ENC-010721



The World in One Day

Grades 4-9

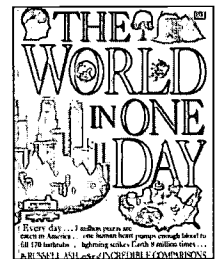
1997

Author: Russell Ash

Ordering Information:

DK Publishing, Inc.
Toll-free: (888) 342-5357
\$15.95 per book (hardcover)

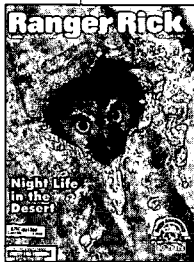
In this oversize book, graphic illustrations and full-color photographs describe the state of the physical world in the late twentieth century. Statistics and information are given for such topics as the human body, world population, and recycling. The book answers questions such as: How many letters are sent around the world in one day? How much food is eaten in one day? A fold-out section highlights a large variety of animals with numerical comparisons including number of heartbeats, volume of food consumed, and hours of sleep needed. (Author/JRS) ENC-011774



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CHILDREN'S MAGAZINES**Ranger Rick***ENC has vol. 31, no. 2 (February 1997)***Grades 2-7**

Ordering Information:
National Wildlife Federation
Toll-free: (800) 611-1599
\$17.00 annual membership



The National Wildlife Federation publishes this periodical each month. Every issue contains full-color photographs and stories that explore the diversity of wildlife and teach readers about the importance of protecting all creatures. The lead article in the February, 1997 issue is about an unusual partnership between Chinese fishermen and cormorants. Additional features include an article about the nocturnal activities of the plants and animals that inhabit the Sonoran Desert; games in which readers interpret animal behavior from a photograph; and facts about stingrays. (Author/LCT) ENC-011265

Your Big Backyard*ENC has Series III, no. 5 (May 1996)***Grades pre-K-1**

Ordering Information:
National Wildlife Federation
Toll-free: (800) 611-1599
\$15.00 per subscription

Each month, this magazine introduces children to the world of nature through photos of baby animals, read-aloud stories, riddles, and games. The magazine combines close-up pictures with simple text to help beginning readers. In sample activities from the May, 1996 issue, children count a dozen baby ducks, find six mistakes in a picture, and make a finger painting of goldfish. (Author/LCT) ENC-012316

Dolphin Log*ENC has issues from January, 1996, to July, 1997***Grade pre-K and up**

Ordering Information:
Cousteau Society
Telephone: (804) 523-9335
\$15.00 per subscription



This bimonthly publication contains stories, activities, and games about marine and other animals. Sample articles explain why fish travel in schools, discuss what kids can do to save the coral reefs, and present examples of the strangest mouths found in the seas. Additional articles chronicle the experiences of the Cousteau Society's ventures into the Tenger Desert and the Himalayas. Regular features include a comic book section about the Cousteau Adventures, word-find puzzles and mazes, and a poster or game board. Winner, Parent's Choice Award. (Author/LCT) ENC-012216

National Wildlife*ENC has vol. 35, no. 2 (February/March 1997)***Grade 8 and up**

Ordering Information:
National Wildlife Federation
Toll-free: (800) 477-5560
\$16.00 for associate membership

Articles and photoessays in this bimonthly magazine place special emphasis on what individuals can do to help solve environmental problems. The February/March, 1997 issue highlights such endangered species as Florida's Key deer and the snowy owl. Additional articles introduce readers to the work of wildlife artist Kevin Daniel and present research about octopus intelligence. Each article is illustrated with dramatic color photographs of the animals. Regular features include research briefs, tips for maintaining a backyard habitat, and membership news. (Author/LCT) ENC-011899

Dragonfly: A Magazine for Young Investigators*ENC has vol. 1 (April 1996) through vol. 1, no. 4 (March/April 1997)***Grades pre-K-4**

Ordering Information:
National Science Teachers Association
Toll-free: (800) 722-6782
\$12.95 for subscription

Published bimonthly from September through June by the National Science Teachers Association (NSTA), Dragonfly is designed to inspire investigation and curiosity in children. Most articles are accompanied by a Science Challenge that provides discussion questions and extension activities. A sampling of topics includes seeds and trees, epiphytes, and student research articles.



Regular departments include a pullout section of home activities, the Dragonfly Home Companion; the Scientist Interview; and How to Submit (investigations, essays, and poems). The Teacher's Companion provides supplemental background information and inquiry based activities, as well as articles about diverse learning styles, learning communities, and integrating language arts and science. (Author/LCT) ENC-004125

World*ENC has no. 237 (May 1995)***Grades 5-8**

Ordering Information:
National Geographic Society
Toll-free: (800) 368-2728
\$14.95 per subscription

The National Geographic Society publishes this monthly magazine on a wide variety of topics including wildlife, science, sports, the environment, and world cultures. Also featured are games, activities, comic strips, contests, and posters. The May 1995 issue highlights rubies and sapphires, langur monkeys, drag racing, and a feature article on Monterey Bay. (Author/DEB) ENC-003313



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Arlington, VA 22209
Toll-free: (800) 624-9120
Fax: (703) 276-0266
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aelinfo@ael.org

demo site

Ray Ramquist
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Phone: (540) 568-6302
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E-mail: ramquirc@jmu.edu

Far West Region

Arizona, California, Nevada, Utah



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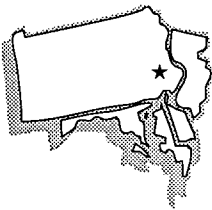
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demo site

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California Academy of Sciences
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San Francisco, CA 94118
Phone: (415) 750-7361
Fax: (415) 750-7106
E-mail: amalley@cas.calacademy.org

Mid-Atlantic Region

Delaware, District of Columbia, Maryland, New Jersey,
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consortium

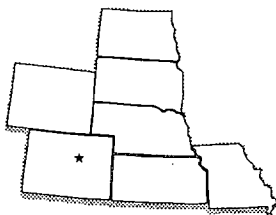
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demo site

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Mid-continent Region

Colorado, Kansas, Missouri, Nebraska, North
Dakota, South Dakota, Wyoming



consortium

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demo site

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North Central Region

Illinois, Indiana, Iowa, Michigan, Minnesota, Ohio, Wisconsin



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E-mail: sdahl@fnal.gov

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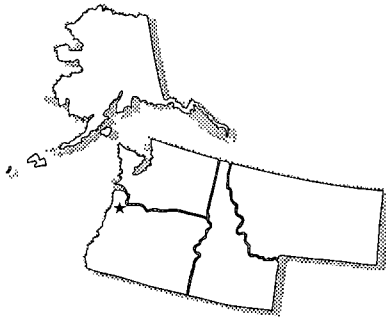


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Northwest Region

Alaska, Idaho, Montana, Oregon, Washington



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Pacific Region

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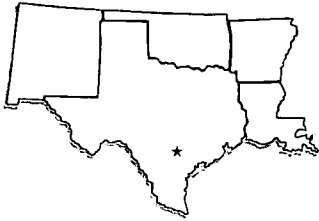


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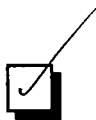


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