



IMPressions

FALL 1997

A NEWSLETTER ABOUT THE INTERACTIVE MATHEMATICS PROGRAM™

Give Your Students Lifelong Problem-Solving Skills

by Moe Burkhart

Moe Burkhart, a teacher at Marshall High School in Los Angeles, CA, has been teaching IMP for six years. She has taught all four levels, and has also been an IMP teacher trainer for three years. She uses the teaching technique she describes below in her classroom and at IMP workshops.

“**W**hat are your questions?” I ask a very full room of students. They respond with silence and blank faces. “OK, get started then, you have 20 minutes.” Slowly, the room comes alive, the kids start to talk—*then* hands go up. I go from group to group, hearing the same questions. “What are we supposed to do?” “How do we get started?” “Can you explain this to us?” etc. Those aren’t the kind of questions that are music to my ears!

How do we elicit “good” questions from our students? With a rich curriculum like *IMP*, the need for this basic skill seems stronger than ever. If kids ask good questions that help define a problem, they’ll be able to entertain that problem on their own.

From the Education Development Center, I’d learned some active listening skills in the form of questions one might ask to better understand a speaker. My group was given model questions to practice and I realized high school students could be given the same types of questions to put to practice.

Working with a team of teachers at my school, we put together some questions for the kids to ask. “What do you mean when you say . . . ?” “How is . . . different from . . . ?” “How is . . . related to . . . ?” The teachers tried using the questions in their classes, but didn’t experience much improvement. The process felt artificial to teachers and students. So, we came up with more strategies—and the one that follows proved to be especially powerful.

The first step I now take when giving students a problem is to give them “sentence strips” on which to write their questions. They’re not allowed to ask me anything directly. I post their questions and stop the class to ask if anyone in the class can answer them.

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Local Businesses Sponsor Mathematics Classrooms

You’ve no doubt seen certificates stating “We Are the Proud Sponsors of . . .” displayed in many windows of businesses in your community. Usually, they acknowledge the financial support of youth sports teams—Little League baseball, soccer, or football—but look again. More and more businesses are also displaying certificates of appreciation which recognize their official sponsorship of their community’s high school mathematics classes.

Adopt-A-Calculator is a program that gives local businesses and service clubs the opportunity to become proud sponsors of mathematics classes to help further mathematics education in their communities. Originally begun by Mike Christensen and Mike Huyck of Pleasant Valley High School in Chico, California, Adopt-A-Calculator is proving to be an excellent means of raising funds to purchase graphing calculators.

To start the program in your area, send a letter to businesses inviting them to support your high school’s mathematics students by making a contribution to purchase one or more graphing calculators. In return, contributors reap a multitude of benefits and

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 Key Curriculum Press
Innovators in Mathematics Education

COMPASS Opens Its Doors

Curricular Options in Mathematics Programs for All Secondary Students (COMPASS), a secondary school implementation project funded in part by the National Science Foundation, opened its doors in September. The project focuses on the implementation of five curriculum development projects which support the NCTM Standards. The projects include the *Interactive Mathematics Program*[™] (IMP[™]), Contemporary Mathematics in Context (Core-Plus Mathematics Project), Mathematics: Modeling Our World (project ARISE from COMAP), MATHConnections (from CBIA in Hartford, Connecticut), and Integrated Mathematics: A Modeling Approach Using Technology (project SIMMS from the Montana Council of Teachers of Mathematics).

Each of these projects has undergone intensive development and evaluation and received substantial funding from NSF. And each is reaching the stage of commercial publication (IMP Year 2 reached bookshelves in August). The implementation project establishes six sites across the country: a central site at Ithaca College in Ithaca, New York, and satellite sites near each of the five curriculum development locations (the Implementation Center for IMP was highlighted in the Spring 1997 issue of IMPressions).

The primary function of the central site at Ithaca will be to inform schools, districts, teachers, parents, administrators, state offices, and other groups about these innovative curricula; aid in the first general phases of implementation; and coordinate requests for additional information and assistance from the satellite sites. Each satellite will provide additional information about its curriculum to these same constituencies as well as professional development opportunities for schools interested in adopting its curriculum.

During the summer, the central site directors, Margaret and Eric Robinson, visited with Implementation directors Lynne Alper and Sherry Fraser and seven IMP teachers to get a first hand impression of the IMP curriculum and

suggestions regarding national implementation. They described their visit as “extremely valuable.” Eric commented “we hope we can transmit the enthusiasm and dedication we found here to schools across the nation. IMP is built on a solid foundation, both in terms of the mathematical content of its curriculum and quality of its current teachers. And best of all, as anyone connected with IMP knows, the students are the winners!”

The COMPASS Web site is located at <http://www.ithaca.edu/compass>.



Margaret and Eric Robinson, COMPASS Directors

IMP Strengthened Through National Network

Networking and collegial collaboration are important to the success of the *Interactive Mathematics Program*. Let us know what you need and what we can do to help you!

The Implementation Center of the *Interactive Mathematics Program* in Sausalito, California, now coordinates all IMP networking—including program, curriculum, implementation, professional development, support materials, outreach, and publishing. You can reach Lynne Alper and Sherry Fraser at the Implementation Center at (415) 332-3328 or at imp@math.sfsu.edu.

Janice Bussey continues as National Outreach Coordinator and is the person to contact with requests for information and questions about support and implementation. Janice connects new IMP schools with IMP national sites and makes every effort to get teachers the training, professional development, and support they need. Janice also



Lori Green

networks with Key Curriculum Press by maintaining a mutual IMP contact database and by following up on all textbook orders. She may be reached at the toll-free IMP Information Line at 1-888-MATH-IMP (1-888-628-4467) or via email at jbimp@telis.org.

Lori Green, author of the *Teaching Handbook for the Interactive Mathematics Program*, is the contact person for the IMP National Sites. She coordinates information among the sites, makes regular contacts, and is available for questions and information. You can reach Lori at (209) 474-8212 or by email at lologreen@aol.com.

You can also visit the new national IMP Web site at www.mathimp.org.

Twelve Bags of Gold

Adapted from Problem of the Week (POW) 15 in The Pit and Pendulum unit in Year 1. Also featured are Spanish and French translations. To receive a Hawaiian translation of this activity, contact the Hawaii Regional Center.

A king has twelve bags of gold. They are all supposed to weigh the same amount, but he has learned that one of these bags contains counterfeit gold, and has a different weight from the rest. Unfortunately, he doesn't know if the different bag is heavier or lighter.

How can he use a balance scale and as few weighings as possible to figure out which bag contains the counterfeit gold and whether it is heavier or lighter? Keep in mind that what you do after the first weighing may depend on what happens in that weighing. Your answer should describe what to do for every possible outcome of each weighing.



Spanish:

Un rey tiene doce bolsas de oro. Supuestamente todas pesan lo mismo, pero él ha averiguado que una de las bolsas contiene oro falso, y tiene un peso distinto a las otras bolsas. Desafortunadamente, no sabe si dicha bolsa pesa más o menos que las otras.

¿Como sería posible usar una balanza y un mínimo de mediciones para averiguar cual bolsa contiene el oro falso y si la misma pesa menos o pesa más? No olvides que lo que haces después de la primera medición podría depender de dicha primera medición. Tu respuesta debería describir lo que hay que hacer para cada posible resultado de cada medición.

French:

Un roi avare avait douze sacs dor de la mme masse. Il vient d'apprendre qu'on a tripoté un des sacs qui n'a plus la même masse que les autres. Malheureusement, il ne sait pas si le faux sac est plus léger ou plus lourd que les autres.

Comment peut-il faire le moins de pesées possible avec une balance pour savoir lequel des douze sacs est faux et si ce sac est plus léger ou plus lourd que les autres? N'oubliez pas que ce qu'on fait après la première pesée peut dépendre des résultats de celle-ci. Il faut décrire ce qu'il faut faire pour chaque résultat possible de chaque pesée.

Lifelong Problem-Solving . . .

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The students soon realize that their peers are resources. I save the sentence strips collected, and after a few weeks, I show them the questions and we discuss which are the "good" questions, and which are not. The criteria is deciding how well the question helped us define and solve the problem. They see that "How do I get started?" doesn't help them get started.

Once we have separated out the good questions, we go to work trying to write the same questions in a way that can be used for any problem (generalizing!). Instead of "Why do we need to find the length of AB?", we'd write "How will . . . help us solve . . .?". "Why do we need to find the rate of the Sawyer's wagon?" becomes "What makes . . . important?". Soon you have a pile of questions "How can we do . . . a simpler way?" "When does . . . make a difference?" "What does . . . have to do with . . .?" to post on chart paper for the coming year (leaving space at the bottom to add more questions as time goes on). The power in this method is that the students have generated this list. The questions belong to them and have not been placed artificially.

Good questions in general form also force the students to be specific with what goes in the blanks. They then have the tools to ask questions that *are* music to your ears. And they get better at this skill with time! Students become more self-confident and less shy about sounding "stupid" when they don't understand and want to ask. Another benefit is that I am also challenged to ask better questions, because I have to model them as well. Students will not use the questions much if they don't hear you applying them!

Creating the sentence strips takes no time out of the curriculum. However, it does take a day to generalize the questions. I find this time well worth spending, because I spend less time later tearing my hair out receiving low-level POWs and other work. Class activities are more lively and meaningful.

Show students how to solve a problem, and they can solve that problem; teach a student how to ask questions and they can problem-solve for life. When I see the results of this powerful process, I feel that students have been given the "fishing rod" to lifelong learning.

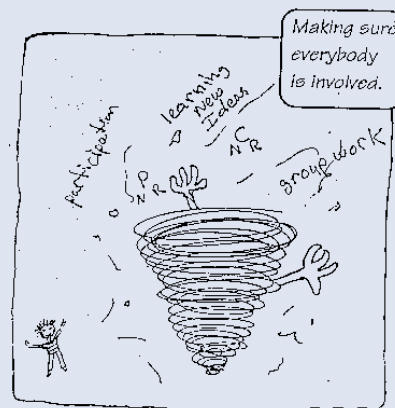
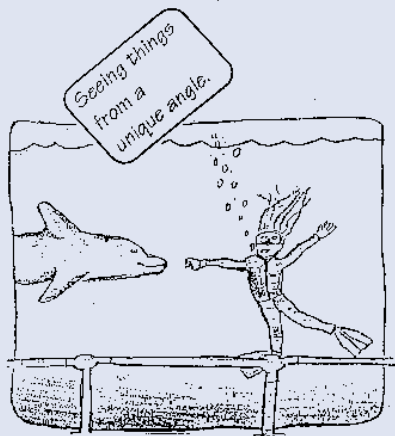
Local Businesses . . .

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acknowledgments which include: earning a tax deduction, receiving a letter acknowledging their generous contribution, receiving a certificate (suitable for display) proclaiming their sponsorship and that their contribution directly benefits all of the high school's mathematics students, having their business card permanently attached to each calculator they've funded, having their business name prominently displayed in each mathematics classroom, and an acknowledgment in the school's newspaper and/or the newsletter mailed to all parents.

The local Chamber of Commerce is a good resource for securing a fairly comprehensive mailing list of businesses and service clubs in your community.

Regional IMPressions



IMP CARTOONS BY STUDENTS AT
BERKELEY HIGH SCHOOL,
BERKELEY, CA

ARIZONA Intel Hosts Dialogue Day for Math, Science, and Technology Teachers

On Friday, October 3, math, science, and technology teachers from the Chandler Unified School District participated in an exciting staff development opportunity. As part of Intel's support of the *Interactive Mathematics Program*[™] in the Chandler schools, Dialogue Day 1997 was developed. The goal of the day was to expand teachers' understanding of the role problem solving, critical thinking, team work, and communication play as they prepare students to be successful in the work force of the future.

After a tour of the facility, teachers were placed in the role of students and asked to use problem solving, communication, and team skills to solve an actual problem that faces Intel employees. The problem asks to find a way to ship 15 million chips out of the factory in three months. The different manufacturing processes, constraints, and variables were given and teachers needed to use a spreadsheet to solve the problem.

Dialogue Day 1997 successfully communicated to teachers the importance of providing students opportunities to solve non-routine problems—using the necessary tools—and the importance of working as a team. It was emphasized that basic content knowledge, while important, should be taught in balance with experiences that include open-ended, problem solving opportunities.

Intel supports the efforts of teachers in the Chandler Schools to implement *IMP*[™] with personal computer and software donations, staff development, summer internships, and other equipment donations. Specifically, Intel has donated money so that teachers can be trained on the use of computers in the classroom. Chandler High School has a 30-station math computer lab running Key Curriculum's *The Geometer's Sketchpad*[®].

CALIFORNIA With over 70 California schools and more than 350 teachers participating in IMP, the challenges are to continue the growth of IMP and to provide support to all the teachers who are involved.

To accomplish this California welcomes two new directors, Margaret DeArmond from East High School in Bakersfield and Jim Short from Hueneme High School in Oxnard. Both Margaret and Jim have taught all four years of the curriculum and have had extensive teacher-leadership experience.

During the past two years Margaret has been president of the California Mathematics Council, in addition to teaching five *IMP* classes. This year she is working with the Kern County Office of Education helping to develop and implement standards in all subject areas as well as directing California *IMP*.

Jim, mathematics department chair at Hueneme, is also co-director of the South Coast Mathematics Partnership, a project that brings together high school teachers and students, and prospective teachers during the summer under the auspices of Santa Barbara Community College and the University of California at Santa Barbara.

Because of California size, in terms of numbers of teachers and large geographical area, California *IMP* has been sponsoring leadership retreats for several years. This past spring, forty-five teachers coming from thirteen regional areas, attended a retreat to discuss issues, develop teacher leadership, and prepare inservice presentations. Funding was provided by The Noyce Foundation and The David and Lucile Packard Foundation. For additional local support, each area can apply to California *IMP* for a grant to be able to provide meetings and networking.

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Some achievements by *IMP* students from California schools:

- The winner of the Mathematics, Engineering Student Achievement (MESA) mathematics competition for 9th grade students this last year was an *IMP™ Year 1* student from Hueneme High School.
- A Mendocino High School student worked on a Duke University sponsored rain forest project in Costa Rica. He attributed his acceptance into this highly sought program to his *IMP* experience since he had some ideas as to how mathematics was used in the real world.

HAWAII Aloha! Hawaii is beginning its fourth year of *IMP* implementation. And the ohana (family) of *IMP* schools has now expanded to 13 schools on four different islands—Oahu, Moloka'i, Kauai, and Hawaii. Seven of the 13 schools offer *IMP Years 1* through *4*. Our five newest sites are Moanalua High School, Konawaena High School, Waianae High School, ASSETS School, and Dole Intermediate (grade 8).

The Hawaiian-language version of Overland Trail entitled “Polynesian Voyaging” was piloted last school year at Kalani, Kapa'a, and Mililani High Schools. The mathematics is more meaningful for our students as Polynesian voyaging is a part of our Hawaiian history and culture. If you are interested in obtaining a copy of Polynesian Voyaging, you may contact Kathleen Nishimura at (808)394-1341 or kathleen_nishimura@notes.k12.hi.us.

Congratulations to Wendy Tokumine, an *IMP* teacher at Farrington High School on the island of Oahu. She is one of Hawaii's three secondary finalists for the Presidential Award for Excellence in Mathematics and Science Teaching.

ILLINOIS The Illinois Regional Center is beginning work under a three-year grant from the National Science Foundation to work with teachers in Chicago to move towards an NCTM *Standards*-based curriculum in their classrooms. The goal is to involve most of the teachers in a school's mathematics department in extensive inservice preparation and support. Schools wishing to be involved in this project may contact the Center. The Illinois Center also has a cadre of experienced *IMP* teacher-leaders who provide workshops and support to schools outside the city of Chicago.

Chicago's Foreman High School, now in its third year of offering the *IMP* curriculum, is providing *IMP* to its entire freshman class. Dr. John Garvey, principal of Foreman, sees *IMP* as a good way of providing an engaging, significant mathematical experience for the students in this racially and ethnically diverse high school on Chicago's northwest side. There are nine Foreman teachers who participated in the extensive inservice preparation and continue to be supported by the Illinois Regional Center staff.

MIDWEST Sara VanDerWert, an *IMP* teacher at Patrick Henry, taught an actual lesson to 14 of her *IMP Year 3* students in an extended session presented at the NCTM conference in April, 1997. These students were also able to participate in discussions with the teachers and administrators present at the session. Among the over one thousand sessions at the conference, this was the only one where actual students were involved. Sara and her students did an excellent job in representing the efforts of our *IMP* site.

In other news from last spring, students at Patrick Henry High School in Minneapolis, MN, took the International Baccalaureate (IB) test. This test is similar to the AP exam, and is recognized world-wide as a rigorous test of mathematical knowledge. Students on the traditional track of geometry, algebra, trigonometry, analysis, and calculus took the IB Math Methods test. *IMP* students took the IB Math Studies test, a test comparable to Math Methods, but for students in a non-calculus curriculum. Both tests carry the same weight in earning points for the IB diploma. Students may earn one to seven points on the test, where three is passing and six is excellent.

The results for *IMP* students taking the test were impressive. Compared to the 14 traditional curriculum students who took the Math Methods test and earned a mean score of 3.00, the 15 *IMP* students taking the Math Studies test earned a mean score of 3.93. And of those students who actually passed each test with a score of 3 or higher, there were 46% traditional students and 87% *IMP* students.

MIDDLE COLLEGE HIGH SCHOOL CONSORTIUM

The Middle College Consortium, a Consortium of 23 Middle Colleges from around the country, received a grant from the DeWitt Wallace Reader's Digest Foundation to implement *IMP* in its member schools over the next three years. The Middle College High Schools are high schools on college campuses that serve at-risk students. The 23 middle colleges formed a consortium four years ago to seek funds to conduct joint staff development and implement an accountability project across the member schools.

This year a total of six of the middle college which are in Lowell, MA, New York City, Los Angeles, and Flint, MI, are implementing *IMP*. A teacher from each high school and a partner who is a professor from the host college are team teaching *IMP 1* in the high schools. All teachers participated in staff development last summer at the Harrison House in Glen Cove, NY, and continue to communicate with each other via email. They will come together again in February to continue to learn how to implement *IMP* and all are excited and enthusiastic. Adding a college mathematics professor to the team will smooth the transition for the students to college level mathematics and expose more college teachers to the curriculum materials and teaching strategies developed by *IMP*.

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Regional IMPressions

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NEW ENGLAND The New England Regional Center (NERC) has grown from three *IMP* high schools in 1994–95 to 31 schools this year. There are now 115 teachers involved in teaching and training, including 63 new teachers who began teaching *IMP* Year 1 this fall. Each *IMP* teacher in the region receives one week of summer training and five release days during the school year. NERC received a National Science Foundation Local Systemic Change grant which gives continued funding for this kind of support for up to 250 teachers through the year 2000. The original focus schools are starting *Year 4* of *IMP* and many *IMP* seniors are electing AP Statistics along with *Year 4*.

Interest in the region is growing as student teachers and interns from local colleges are requesting *IMP* classrooms. Students from Harvard, Tufts, Northeastern, Boston College, and other schools have participated in NERC training with their supervising teachers. One of our Harvard interns, David Bookston, an enthusiastic *IMP* team member at Brookline High, was hired to teach full time this year at Needham High—one of our *IMP* high schools. David's proud father, a Brookline math teacher, participated in *IMP Year 1* training this summer, as well.

Mary Hogan, a NERC co-director, spoke about reform mathematics and *IMP* on the National Public Radio talk show, *The Connection*. Mary teaches *IMP* at Arlington High School and also teaches a math program at Boston College for adults using several *IMP* units. One of her Boston College students called to proudly announce that she was the mother of an *IMP* freshman at The Brimmer and May School, an independent school in Brookline. The *IMP* family is well and growing in New England.

NEW YORK The New York Regional *IMP* program has expanded this year. Through the support of the NYC Urban Systemic Initiative, the New Visions Annenberg Network, the High School Superintendencies and Lehman College, there are now 10 additional high schools implementing *IMP*.

Due to the commitment and dedication of our *IMP Year 1* teachers and administrators last year, their high schools served as demonstration models of effective implementation of the program. These successful models of *IMP* stimulated interested among teachers and administrators throughout New York City. And in a cross-regional collaboration, the assistant principals and teachers who taught *IMP Year 1* last year, and Joe Merlino from the Philadelphia *IMP* region, served as copresenters for our current *IMP Year 1* professional development program.

NORTHWEST Congratulations to Brent McClain, an *IMP* teacher at Westview High School in Beaverton, Oregon, who was last year's recipient of the Presidential Award for Excellence in Mathematics and Science Teaching from the state of Oregon. Brent has taught the first three years of *IMP* at Westview, where the *Interactive Mathematics Program™* has been supported by the Intel and Noyce foundations. This year, Brent has come out of the classroom to help provide support for schools implementing *IMP*, and also to work on a NSF-sponsored grant to improve teacher training in the state of Oregon.

IMP-NW has added three new schools this fall: River Ridge and North Thurston High Schools in Lacey, Washington, and Century High School in Hillsboro, Oregon. Interest is growing in the region and we continue to work with schools to provide the support necessary to increase and sustain reform in mathematics education. Oregon's education reform law has begun to affect its first students—this year's 9th grade class. Students will now be required to complete a Certificate of Initial Mastery (CIM) sometime around their sophomore year. The state of Washington is moving toward similar legislation.

PENNSYLVANIA The School District of Philadelphia released its annual report card in September for individual schools based on citywide scores on the Stanford Achievement Test-9th edition (SAT-9), staff and student attendance, and promotion.

In a matched-sample analysis of SAT-9 scores of 11th grade *IMP* students versus traditionally taught 11th grade algebra students at two highly academic Philadelphia high schools, the *IMP* students scored better in most categories of the test.

In the Philadelphia suburbs, the Wallingford/Swarthmore School District has adopted *IMP* and Visual Mathematics (an NSF-funded program for the middle school). The result is a well-coordinated K–12 mathematics program which is producing exceptional student achievement outcomes. All 20 mathematics teachers in the district are involved in training for both programs.

The Philadelphia Education Fund is working on a report which will show how “teacher networks” like *IMP* have had a profound influence on policy in the Philadelphia Schools District. In order to implement educational reform, the district has had to rely on *IMP* and other “networked teachers” to exert leadership in various non-classroom capacities throughout a district. Many *IMP* teachers, for example, have been playing key leadership roles in the Philadelphia district in creating new citywide standards and assessments, and designing citywide mathematics summer inservices. And, several *IMP* teachers have gone on to occupy important administrative positions. For example, Kathleen McKinley, a former *IMP Year 3*

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Interactive Mathematics Program™

National and Regional Centers Contact List

NATIONAL OFFICE

P.O. Box 2891, Sausalito, CA 94966
Contact: Sherry Fraser
Phone: (415) 332-3328 Fax: (415) 332-3381
(1-888)MATH-IMP (toll free information line)
email: imp@math.sfsu.edu

ARIZONA REGIONAL CENTER

c/o Phoenix USI
2411 West 14th Street, Tempe, AZ 85281-6942
Contact: Nora Ramirez
Phone: (602) 731-8062 Fax: (602) 731-8062
email: ramirez@maricopa.edu

CALIFORNIA REGIONAL CENTER

Kern County Superintendent of Schools Office
1300 17th Street, City Centre
Bakersfield, CA 93301-4533
Contact: Margaret DeArmond
Phone: (805) 636-4657 Fax: (805) 636-4135
email: margaret_dearmond@fc.kern.org

ROCKY MOUNTAIN REGIONAL CENTER

c/o Cherry Creek School District
1855 Joliet Street, Unit 3, Aurora, CO 80012
Contact: Jean Klanica
Phone: (303) 751-0895 Fax: (303) 338-4301
email: jean_klanica@ceo.cudenver.edu

HAWAII REGIONAL CENTER

c/o OASIS-SRG
189 Lunalilo Home Rd., 2nd Floor
Honolulu, HI 96825
Contact: Kathleen Nishimura
Phone: (808) 394-1341 Fax: (808) 394-1304
email: kathleen_nishimura@notes.k12.hi.us

ILLINOIS REGIONAL CENTER

c/o IMSE University of Illinois
950 South Halsted, Chicago, IL 60607-7019
Contact: Margaret Small
Phone: (312) 355-0271 Fax: (312) 413-7411
email: msmall@UIC.edu

NEW ENGLAND REGIONAL CENTER

c/o Northeastern University
360 Huntington Avenue, Boston, MA 02115
Contact: Carla Oblas
Phone: (617) 373-2276 Fax: (617) 373-8562
email: oblas@neu.edu

MIDWEST REGIONAL CENTER

c/o Edison High School
700 22nd Avenue Northeast
Minneapolis, MN 55418
Contact: Judy MacAlpine
Phone: (612) 627-2982 Fax: (612) 627-2982
email: jmacalpi@mpls.k12.mn.us

MIDDLE COLLEGE HIGH SCHOOL CONSORTIUM CENTER

c/o La Guardia Community College
45-35 Van Dam Street
Long Island City, NY 11101
Contact: Cece Cunningham
Phone: (718) 349-4000 Fax: (718) 349-4003
email: ceccullen@aol.com

NEW YORK REGIONAL CENTER

c/o Lehman College, Carman Hall B33
Bedford Park Blvd., Bronx, NY 10468
Contact: Suzanne Libfeld
Phone: (718) 960-8078 Fax: (718) 960-7855
email: suzli@aol.com

NORTHWEST REGIONAL CENTER

c/o Grant High School
2245 NE 36th Avenue, Portland, OR 97212
Contact: Sue Yabuki
Phone: (503) 916-5160 Fax: (503) 916-2695

PENNSYLVANIA REGIONAL CENTER

c/o La Salle University
1900 West Olney Avenue, Box 399
Philadelphia, PA 19141-1199
Contact: Joe Merlino
Phone: (215) 951-1203 Fax: (215) 951-1843
email: merlino@lasalle.edu

NEW BRUNSWICK, CANADA, IMP CENTER

P.O. Box 6000, Kings Place, Fredericton
New Brunswick, Canada E3B5H1
Patricia Belliveau-White, Mathematics Consultant
Phone: (506) 444-5359
email: patricib@gov.nb.ca

NOVA SCOTIA, CANADA, IMP CENTER

Acadian and French Language Services Branch
Department of Education and Culture
PO Box 578, 2021 Brunswick Street
Halifax, Nova Scotia
Canada B3J 2S9
Antoine Jarjoura, Math and Science Consultant
Phone: (902) 424-5840 Fax: (902) 424-3937
email: jarjoua@ednet.ns.ca

THE NATIONAL IMP WEB SITE:
www.mathimp.org

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teacher, was appointed on September 1, 1997 to be an assistant to the Director of the Philadelphia Urban Systemic Initiative.

The Philadelphia site is working with the New York site to provide *IMP* training. This year, the Philadelphia *IMP* program welcomes 22 new *IMP* teachers. *IMP* is currently being taught in half of Philadelphia's 34 high schools.

ROCKY MOUNTAIN Interactive Mathematics Program-Rocky Mountain Region (*IMP-RMR*) began in the 1994-95 school year with five Colorado schools and about a dozen teachers. As the 1997-98 school year begins, *IMP-RMR* has expanded to 23 schools, including one school in New Mexico and one in Wyoming, and about 90 teachers!

The experience and expertise of the faculty at Eaglecrest High School, one of the original *IMP-RMR* schools, informed our professional development model which includes a two-week summer workshop for teachers new to *IMP*, a one-week summer

workshop for those teaching a new year of *IMP*, a three-day retreat prior to the start of school for all project teachers; quarterly one-day gatherings for all project teachers, and a three-day immersion one month into the school year for first-year *IMP* teachers. Additionally, there are weekly visits from project staff who observe and meet with project teachers, regular communication via email, a daily professional development period for project teachers in their first two years (in addition to the planning time usually provided by their schools), and leadership development activities for experienced project teachers.

As *IMP-RMR* has grown, administration of the project has been reorganized and broadened. In addition to the three project directors, two new leadership team members have been added this year. The leadership team coordinates the efforts of the large team of program coordinators and facilitates electronic communication among the project's participants. *IMP-RMR* is currently funded by grants from the National Science Foundation, the Gates Family Foundation, the Colorado Department of Education, and participating school districts.

Key Comments

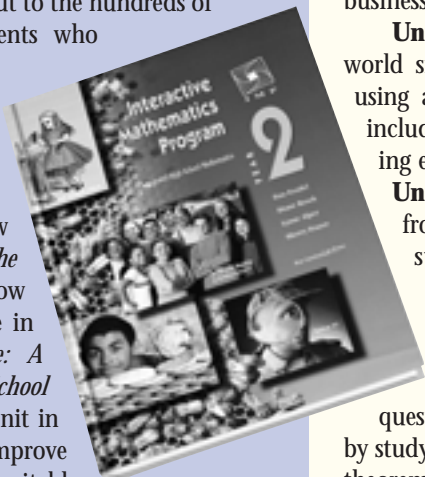
Authors, editors, and teachers were excited when *Year 2* was released in August 1997 and Key Curriculum is happy to report that *IMP's* popularity continues a very healthy growth. Many thanks go out to the hundreds of teachers and thousands of students who field-tested the materials, and the input of many other mathematics professionals—all essential in helping to develop a reform curriculum that really works.

In addition to *Year 2*, the new *IMP Year 1: Calculator Guide for the TI-81, TI-82, and TI-83* is also now available. And planned for release in January, 1998 is *It's All Write: A Writing Supplement for High School Mathematics Classes*—formerly a unit in *Year 2*—which helps students improve their mathematical writing and is suitable for use in all four years of *IMP*, as well as in all secondary traditional mathematics classes.

IMP Year 3 is slated for release in 1998. *IMP Year 4* is currently undergoing final field-testing and will be released in 1999.

We're also pleased to announce that the new national *IMP* Web site is now up and running—offering the *IMP* community a rich array of materials and services, as well as a powerful networking and information exchange. You can visit this new site at www.mathimp.org or reach it from the Key Curriculum Web site at www.keypress.com.

If you know anyone interested in learning more about *IMP*, there is a free book available—*Introduction and Implementation Strategies for the Integrated Mathematics Project: A Guide for Teacher Leaders and Administrators*. Also, try the 3-week replacement unit, *Baker's Choice*. For more information about *IMP* implementation, contact Janet Bussey at 1-888-MATH-IMP (1-888-628-4467).



Year 2 Textbook Rolls Out

The five units of *Year 2* reinforce the concepts students learn in *Year 1* and move into new mathematical areas. Students explore mathematics through literature, science—even the business world of a bakery!

Unit 1: *Solve It* focuses on using equations to represent real-world situations and develops the skills to solve these equations using algebraic and graphical methods. Other concepts covered include equivalent expressions, the distributive property, simplifying equations, and linear and nonlinear equations.

Unit 2: *Is There Really a Difference?* builds on statistical ideas from *Year 1's* unit *The Pit and Pendulum*, expanding understanding of statistical analysis. Mathematical concepts include forming a hypothesis and the corresponding null hypothesis, testing hypotheses using the chi-square statistics, and designing and carrying out a statistical study.

Unit 3: *Do Bees Build It Best?* asks students to answer the question, “What is the best shape for a honeycomb?” They begin by studying area and proceed to prove the Pythagorean right-triangle theorem using an area argument, then turn their attention to volume and surface area, focusing on prisms whose bases are regular polygons. They combine their knowledge of surface area, volume, and trigonometry to determine the most efficient use of space.

Unit 4: *Cookies* deepens students' understanding of the relationship between equations and inequalities and their graphs, as they work to maximize profits for a bakery. They use this understanding to develop principles of linear programming, and they invent algorithms for solving systems of linear equations.

Unit 5: *All About Alice* starts with a model based on Alice's Adventures in Wonderland, through which students develop the basic principles for working with exponents—positive, negative, zero, and fractional. The study of exponents provides a natural context for the introduction of logarithms and their use. Scientific notation and the idea of order of magnitude are also introduced.

Teacher materials for *Year 2* include guides for each of the five units and the *Teaching Handbook for the Interactive Mathematics Program: A Teacher-to-Teacher Guide* provides a guide to issues generic to all units of *IMP* in *Years 1* and *2*.




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