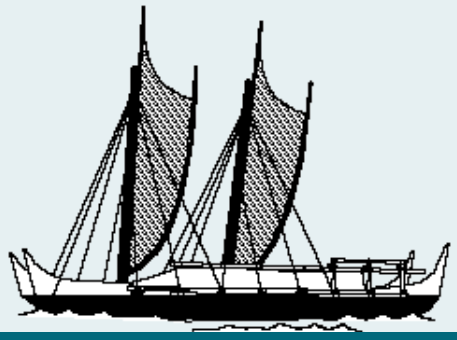
Pacific Mathematics and Science Regional Consortium
An Eisenhower Consortium

Voyages in Mathematics and Science



PACIFIC RESOURCES FOR EDUCATION AND LEARNING

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WEBsite: http://www.prel.hawaii.edu/math-science

PRESS and Mathematics and Science Improvement: A Pathway to Success

The Pacific Mathematics and Science Regional Consortium is using and adapting the PRESS (Pacific Region Effective and Successful Schools) process to support math and science instruction improvement efforts. PRESS is a set of steps for thinking, planning, and carrying out actions that improve student learning. It is the process selected by Pacific educators to organize the knowledge and experience of parents, teachers, principals, community members, and students in helping each school and community improve and grow toward its vision for the future.

Math and Science Consortium staff, PREL Pacific Educators in Residence, PREL Service Center Coordinators, and the new CNMI Commissioner of Education met recently in the CNMI to review PRESS resources in order to better use the process in their work with programs, schools, and communities. Participants in this collaborative planning session were: (front row, left to right) Dr. Rita Hocog Inos, former PREL Deputy Director and now the CNMI Commissioner of Education; and Jean Olopai, Research Information and Training Officer, CNMI Public School System; (back row, left to right) Li'a Amisone, American Samoa Service Center Coordinator; Evelyn Joseph, Pacific Educator in Residence, Republic of the Marshall Islands; Lydia Amisone, Pacific Educator in Residence, American Samoa; Pam Legdesog, Yap Service Center Coordinator; Alice Borja, Guam Service Center coordinator; Kathy Busick, Mathematics and Science Curriculum Assessment, Instruction, and Reporting (CAIR) Specialist.

The vision that guides mathematics and science in the Pacific–*All Pacific children will be come mathematically and scientifically literate*–has been the foundation for decision making in several schools. Achieving this vision requires expanding it to include instruction in language, social studies, preparation for employment, culture, and the arts. It's always easy to look for quick solutions by turning to new programs, packages, and "canned" answers. True improvement in mathematics and science, however, is more likely to happen when people work together and everyone plays an active role in the process.

When PRESS is in action, school and community partners:

- Proceed with a shared vision that guides their decisions
- Gather honest and accurate information in relation to that vision for success

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The Third International Mathematics and Science Study (TIMSS)

Do American students achieve higher or lower comprehension levels in science and mathematics than students of the same age or grade level in other countries? How do United States students compare with students in other countries in science and mathematics literacy?

Since 1959, the International Association for Evaluation of Educational Achievement (IEA) has carried on a series of international comparative achievement studies intended to evaluate the level of student performance in different countries.

TIMSS, the "Third International Mathematics and Science Study," conducted in 1995, is the world's largest and most comprehensive study of mathematics and science education, gathering information about more than 500,000 students from 41 nations, including the United States. The goal of the study is to provide information that will inform policymakers, educators, and community members as they think about improving mathematics and science education. To do this, TIMSS compared teaching, curricula, and student achievement across the participating countries. An in-depth study of education in the United States, Japan, and Germany was also carried out as part of TIMSS.

The study looked at students, teachers, schools, curricula, instruction, and policies in grades 4, 8, and 12 in order to understand the educational contexts in which mathematics and science learning take place, and to answer the following questions:

- How do teachers in different countries teach?
- How do their instructional practices differ? How do these differences affect learning? What can we learn from this?
- What curriculum differences exist among countries? What subjects are taught where and when? What subjects are not covered?
- What are the different social and cultural contexts in which this learning takes place? How do these contexts affect learning?

What have we learned so far? The study was so extensive that there is still much more to be learned as data analysis continues; however, a number of important findings have already emerged.

The achievement of U.S. students compared to those in other nations declined as schooling progressed. At the 4th grade level, U.S. students were above the international average in both mathematics and science; at the 8th grade level, they were below the average in mathematics and only slightly above in science, and by the 12th grade, U.S. students performed well below the international average in both mathematics and science. Learning is a complex process affected by an extraordinarily large number of factors, so there is no single answer that explains this decline in relative achievement. There are, however, some differences in education in Japan and Germany that may serve as indicators:

- The content of U.S. mathematics classes requires less high-level thought than classes in Germany and Japan.
- Topic coverage in U.S. 8th grade mathematics classes is less focused than in Germany and Japan. The typical U.S. curriculum includes significantly more topics, and less time is devoted to each.
- U.S. mathematics teachers'typical goal is to teach students how to do something, while Japanese teachers focus on developing an understanding of underlying concepts.
- Although most U.S. teachers report familiarity with reform recommendations, few apply them in their classrooms.
- Unlike new U.S. teachers, new Japanese and German teachers receive a long-term structured apprenticeship in their profession.
- Japanese teachers have more opportunities to discuss teaching-related issues than do U.S. teachers.
- In the U.S., students in higher-level mathematics classes study different material than students in lower-level classes. In Japan and Germany, all students study the same material.

More extensive information on TIMSS and the results of the study may be obtained from the following websites:

Eisenhower National Clearinghouse
http://timss.enc.org/

Mid-Atlantic Consortium
http://www.rbs.org/eisenhower/resources/timss.html

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TIMSS

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National Center for Education Statistics
http://nces.ed.gov/timss/

Michigan State University
http://ustimss.msu.edu

Boston College
http://wwwcsteep.bc.edu/timss

Each of these sites contains a wealth of information that can lead to fruitful discussions between teachers, parents, community members, and policymakers concerned with improving mathematics and science education.

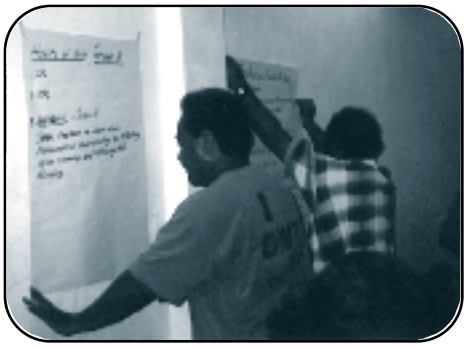
"TIMSS Tidbits"

- There is no significant gender gap in mathematics achievement at any grade level in the U.S., and the difference in performance between boys and girls in science was one of the lowest in the world.
- U.S. 8th grade students performed relatively better in algebra, geometry, earth science, life science, and environmental issues than in geometry, measurement, chemistry, and physics.
- U.S. teachers have more college education than their colleagues in most other countries.
- Eighth-grade students of different abilities are typically separated into different classrooms in the U.S. and into different schools in Germany. In Japan, there is no grouping by ability.
- U.S. teachers assign more homework and spend more time in class discussing homework than do teachers in Germany and Japan.
- In the U.S., students in higher-level mathematics classes study different material than students in lower-level classes. In Japan and Germany, all students study the same material.
- Extensive television watching is common among both U.S. and Japanese students.
- U.S. students use calculators and computers more often than students in most other countries participating in TIMSS.
- Students in the U.S. have more educational resources at home and in school than students in other countries.
- At the 4th and 8th grade levels, U.S. students spend more time in mathematics and science classes than students in Germany and Japan.
- Lessons in the U.S. are more frequently subject to irrelevant diversions and interruptions than lessons in Japan and Germany.
- Japanese teachers work 8 to 9 hours a day and have 1.25 more hours a day than U.S. teachers do for planning, which is structured in extended time blocks after students leave. German teachers spend only 5 to 5.5 hours a day with students and are expected to spend almost an equal amount of time for lesson planning on their own. In the majority of U.S. schools studied, teachers work 7 to 8 hours. Blocks of planning time rarely last longer than 45 minutes and teachers do not have enough time to work together.

Chuuk Mathematics Framework Workshop

Principals in Chuuk State, FSM, develop a mathematics framework for grades one through eight while referring to the *Pacific Standards for Excellence in Mathematics*. Chuuk's mathematics framework and curriculum will be aligned with Pacific standards.

Hands-on experiences give principals a taste of standards-based teaching and learning. By playing the "Poison Game" (see directions below), Chuuk principals find mathematics connections in patterning, logical thinking, and prediction making. They explore ways to use the game with teachers in professional development activities and with students in the classroom.



In small groups, principals draft sections of the mathematics framework including overall goals, the importance of mathematics, principles of teaching and learning, and mathematical habits of mind. Later, the groups reviewed each other's work.

Principals from many schools in Chuuk collaborate to develop a framework that will enable all Chuukese children to be mathematically literate, capable, and caring. Elementary and secondary principals work together so that more students will be successful at all levels.

The "Poison" Game

Materials: Ten counters, such as blocks, shells, stones, or sticks

Object of the Game: Players take turns removing one or two counters. Each player tries to use a strategy that will cause the opponent to remove the last counter(s).

Directions:

1. There are two players.
2. Ten counters are placed between the players.
3. One player is chosen to go first.
4. The players in turn remove one or two counters from the table.
5. Play continues until all counters have been removed.
6. The loser is the player who removes the last counter(s).

A Family of Cards*

Grade levels: 1-3
Skills practiced: Addition and subtraction
No. of players: Whole class
Materials needed: Playing cards (ace through 10 only), die, calculator (optional)

Directions:

1. The class is divided into two groups, Group A and Group B. Each group may select another name for itself.
2. The teacher removes all the face cards from the deck (K, Q, and J), keeping the ace through 10 cards only.
3. The teacher scatters the cards face up on a table or on the floor between the two groups.
4. The teacher rolls the die for each group. The group with the larger number plays first.
5. The first player of the starting group picks any three cards that can be made into *number sentences*–addition and subtraction equations. This player tries to name all the number sentences for the three numbers drawn. For example, if the player chooses 7, 3, and 10, then these are all the possible number sentences: 7 + 3 = 10, 3 + 7 = 10, 10 - 7 = 3, 10 - 3 = 7.
6. If player #1 can name all the number sentences, his/her team keeps the cards.
7. If player #1 cannot name all the number sentences, he/she passes those cards to the first player in the other group. The new player now tries to make the number sentences. This player's team keeps the cards if the number sentences are accurate.
8. If neither player can say all the number sentences, the cards are given to the teacher to give the number sentences. The teacher keeps these cards.
9. Player #2 from the other group goes next, picking any three cards and taking the same steps.
10. The groups alternate turns. Play continues until no more number sentences can be made.
11. Each group adds the values of the cards it has collected. The numbers may be added mentally or with a calculator. The group with the larger total is the winner.

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* Adapted from "Card Smarts," presented by Dr. Karol L. Yeatts at the 1998 NCTM Annual Meeting in Washington, D.C.

Multicultural Education in Mathematics*

The word "culture" can refer to a number of different factors: people of different genders, ethnic or racial groups, places of residence, places of origin, occupations, or age groups. Local communities also have their own cultures. Throughout history, people of all cultures have used mathematics in their lives. They count objects and people, measure various quantities, invent ways to describe the passage of time, design buildings, and play games that involve mathematics. Over time, different cultures share mathematical ideas and terminology.

By bringing multicultural education into the mathematics curriculum, teachers can enrich their students' learning. In particular, the mathematics curriculum must be meaningful for all students and must prepare them for today's world, as well as for the world of the future. "The most important and most valid mathematics curriculum is one that resonates to the students' own lives and experiences," says Zaslavsky.

Mathematics becomes real when students participate in activities that show how mathematics is used to solve people's needs: for example, building a home. Students might learn why homes in different parts of the world were built with certain materials and in certain shapes, sizes, perimeters, and areas. They can discuss structures built in the past and those now being built, as well as the reasons for different designs. When students are learning how to estimate and approximate, they can see how art, social studies, and other subjects tie in with mathematics.

Students can also learn about different cultures and environments when their teachers link the content of various subjects to explain actual application in the real world. This approach makes learning meaningful. Studying only the special holidays of different cultural groups reduces multicultural education to a trivia game. Some of the most worthwhile contributions to a multicultural mathematics program may come from the students and their families. Several key principles should underlie the design of a multicultural mathematics curriculum and its classroom implementation:

- Teachers must believe deeply that all children can learn. Teachers should be willing to consider learning styles, appropriate materials, and assessment strategies that are relevant to the curriculum.

- The curriculum must challenge students to develop their thinking skills. One of the mathematics standards is "mathematics as reasoning." Embellishing a routine exercise with an unreal story context does not motivate students, regardless of ethnic and cultural content. Traditional classroom instruction in mathematics was not connected to anything practical and had little relevance to students' lives or to other aspects of school.

- The curriculum should encourage the sharing of cultural knowledge and develop respect among the students for each other, members of the community, and peoples of the world.

- A multicultural curriculum should empower all students by developing their leadership qualities, promoting creativity, and building confidence in their ability to apply mathematical concepts to the problems they encounter.

To achieve a genuine multicultural program would require 100-percent involvement and a revision of all subject areas within the entire curriculum. There are steps that teachers can take to implement a multicultural mathematics curriculum, including replacing traditional classroom activities with ones that offer culturally relevant enrichment. As members of society, teachers must learn to change their own stereotypic attitudes and behaviors as they are teaching students to change theirs. "Offering students the opportunity to contribute to the content of the curriculum may be just what is needed to turn them on to math!" says Zaslavsky.

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* Adapted from "Bringing the World into the Math Classroom," by Claudia Zaslavsky, ENC Focus for Mathematics and Science Education, 1998, Vol. 5, Issue 1, p. 5.

Surfing the Information Superhighway

http://www.mhpcc.edu/~kidsci – Explore the reefs of the Pacific Ocean without getting wet. Through the ReefQuest link at this KidScience site, students can learn and interact with science instructors and ocean researchers via distance learning technology. Patty Miller, Hawai'i Department of Education teacher, hosts this KidScience program.

http://www.ncrel.org/mands/int.htm – This site contains information for educators and community members who are working on systemic improvement in mathematics and science education. Descriptions of K-12 curriculum projects that integrate mathematics and science content are included.

http://www.4kids.org – Do you have time to surf the Internet for kid-safe sites? Let this site do the searching for you. Students can spend their online time learning rather than searching. Each week, the site features three or four fun and educational sites that can serve as the basis for lesson plans or a launch pad into cyberspace. Previously featured sites have been archived.

http://www.gsn.org/ – This site presents a registry of Internet projects offered by Global SchoolNet (GSN) and other organizations. Articles on classroom use of the Internet are included. Students and teachers can connect with other classrooms around the world through this site.

http://www.webteacher.org – Feeling left behind by the Internet revolution? You can do something about it by navigating this website, which will lead you on a self-paced Internet tutorial that offers both basic and in-depth information about cyberspace. Easy-to-follow lessons on topics such as e-mail, video conferencing, chat rooms, web page design, Internet safety, curriculum searches, and many more are available at the click of a mouse.

http://www.edc.org/mcc – This website offers information about the K-12 Mathematics Curriculum Center, established by Education Development Center, Inc. Learn about various mathematics curriculum programs, as well as timely updates about upcoming events, and links to publishers, developers, and other sources of information and services. Curriculum programs include *Everyday Mathematics (K-6), Mathematics in Context (5-8), Interactive Mathematics Programs (9-12)*, and many other mathematics programs that are aligned with mathematics standards.

Children and teachers in Ebeye, Republic of the Marshall Islands, discover the excitement of learning new mathematics skills. Learning cooperatively and using hands-on materials make math fun and meaningful.

Solving a measurement problem.

At a family gathering, children have fun playing a math game.

At the end of a mathematics institute, teachers at Ebeye Public School relax together before lunch.

Mōkapu Elementary School Improvement Model in Science

"We took a test called the Cell Quiz during our last session. I learned how much I knew and how much I had to guess at the answers. I learned a lot from the discussions I had with the other teachers. I really realized the importance of communicating with a peer when questioning and analyzing a problem." (Kindergarten teacher)

Elementary teachers generally have little access to information about recent developments in learning and teaching. They often have few opportunities to expand their knowledge by learning newly developed programs in mathematics and science, and many of these innovative programs were not available during their preservice preparation. Like professionals in other fields, teachers need to keep abreast of new developments in education.

In December 1996, teachers at Mōkapu Elementary School approached the Curriculum Research and Development Group (CRDG) for help in implementing the Developmental Approaches in Science, Health and Technology (DASH) program. These teachers also wanted to integrate the school curriculum in grade levels K-6. In partnership with the Pacific Mathematics and Science Regional Consortium at PREL, CRDG is now providing technical assistance to help Mōkapu Elementary develop a whole-school comprehensive approach to improving science education.

The multi-year project provides professional development throughout the school year. Daylong sessions are designed to assist teachers interested in changing their instructional approaches in order to align them with National Science Education Standards and Hawai'i Content and Performance Standards. Teachers are grouped into three teams representing grades K-1, 2-3, and 4-6. In all, 53 teachers, 2 staff members, and 2 administrators are involved in the project.

The major intended outcomes of the project include the following:

- Participants will gain additional philosophical, sociological, psychological, pedagogic, and disciplinary science background to fortify their personal classroom encounters and prepare them to become master teachers.
- Teachers will learn new strategies for organizing instruction in the classroom and for integrating science with other subject areas.
- The sessions will serve as a forum for discussing and analyzing classroom experiences.
- As part of the project, action research conducted will be collected and published for distribution to other educators.
- A model for school improvement that other elementary schools or complexes can replicate will be developed.

CRDG monitors the impact of activities on both teachers and students. Some impact questions and strategies employed include the following:

1. *What is the impact of the professional development activities on teachers?*

2. *What is the impact of the professional development activities on students?*

To assess impact on teachers, the Mōkapu Elementary School participants have developed a self-assessment tool that measures the characteristics of an effective classroom. The teachers collaborated to create a rubric that they will use as they organize their classrooms, plan curricula, implement strategies, and coach/assess/reflect on changes in their teaching processes. Data reflecting changes in teacher planning are collected, and sample lesson plans are reviewed for use of techniques taught during staff development activities. Such data include observations of actual classroom performance, evidence of teacher leadership in school and community groups, amount of cooperative team-oriented activities and support, and responses to a written questionnaire.

To determine impact on students, student progress and achievement test data will be analyzed. Among the most important data may be the comments by teachers as they reflect on the learning experiences. Following are three samples:

"The students are getting really good at making graphs as a class. We spend at least one unit a week on making class graphs. It can cover topics such as the color of our eyes, the number of people in our families, our favorite foods, our favorite Christmas characters, our

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Mōkapu Elementary School

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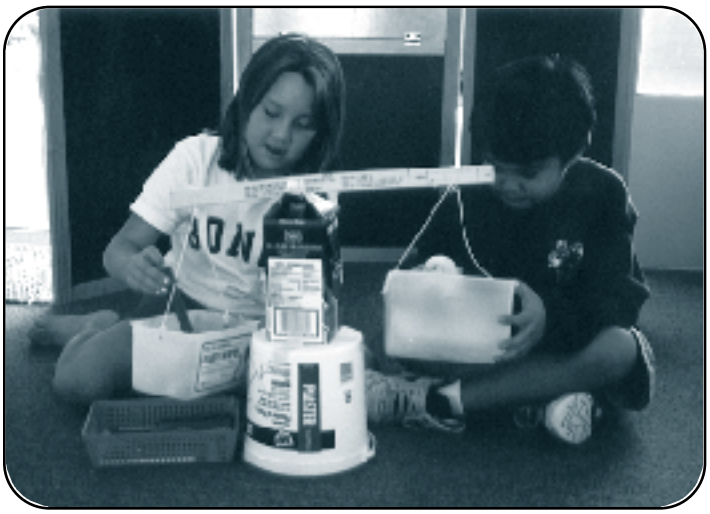
favorite colors, etc. The children are showing a grasp of the numbers and calculations of numbers." (Kindergarten teacher)

"Our Halloween pumpkin provided for an array of activities. First, the students learned to measure its circumference with a string. Second, the children grew plants from its seeds to learn that plants are living things that need water, food, and space to grow. Third, the pumpkin showed the process of decomposition in an enormous way. Last, the decomposing pumpkin provided many living things for the students to catch in their invented animal cages. In devising the cages, the students had to provide for a habitat consisting of shelter, water, food, and space." (Grade 1 teacher)

"Animals open so many doors for my students. They learn to take responsibility for the care of the pets. They watch the changes that occur through growth and metamorphosis. They observe the behavior of the animals. They learn about reproduction and waste products of animals and the scientific terminology to describe animal functions. They learn and compare the various animal classifications: mammals, fish, amphibians, reptiles, and insects. What better way for my students to understand that they are part of the animal kingdom than to study and observe a classroom of living animals!" (Grade 1 teacher)



Students calibrate the weighing apparatus they created.

Teachers try out DASH activities before teaching them to students.

Rules of the road and transportation activities are put to the test.

Teachers Explore Environmental Issues in Operation Pathfinder 4 Institute

Teachers from the Pacific islands and Hawai'i gathered on O'ahu in July for two weeks of marine science workshops called Operation Pathfinder 4. Sponsored by Hawai'i Sea Grant's Pacific Program and Pacific Resources for Education and Learning (PREL), Pathfinder 4 hosted 17 teachers from Micronesia, American Samoa, and Hawai'i for teacher training workshops aimed at improving teaching skills and broadening teachers' knowledge of marine environmental issues.

Pathfinder 4 re-introduced elementary, middle school and high school teachers to basic principles behind coastal processes and the ocean environment. Workshops are designed to help teachers incorporate local environmental issues and concepts into classroom curricula on their home islands.

Workshops included a short history of oceanography, regional geology, marine pollution, beach formation and nearshore processes, coral reef ecology, aquatic resources and stream uses, coastal uses, deep sea technology, climate change, and coastal habitats.

(l to r, back row) Community advocate John Reppun, educator Amy Leurson; Pathfinder 4 teachers Elias Robert, Stacey Renwick, Alfonso Bungitak, Shenander Batol, Hanson Sigrah, Moenuu Muafono, Master Salle, Renwick Bibilone, Martin Weirlangt; (l to r, middle row) Mixon Jonas, Autero Latorres, Tone Herkinos, Liz Kumabe (coordinator), Glenn Johnson, Jane Beachy (student intern), Ted Morris; (l to r, front row) Obet Mote, Sophia Hu, Irene Mafnas and Elisapeta Alaimaleata.

—P. Billig photo

Sea Grant Coastal Recreation & Tourism Extension Agent Chris Woolaway (l) provided classroom instruction on marine pollution, including strategies for conducting beach clean-ups with teachers and students, the importance of using data cards to record information on debris collected, and the impacts of certain discarded debris on marine animals. Claire Cappelle (r), planning and policy analyst for the State Department of Business, Economic Development and Tourism, provided details on the International Year of the Ocean. (Inset) Pathfinder teachers got involved with a beach cleanup at a site off Lagoon Drive near the Reef Runway. Teachers from the Pacific islands plan to get involved in this year's International Coastal Cleanup on September 19 on their home islands.

—Liz Kumabe photos

Alfonso Bungitak from the Marshall Islands looked at sand samples under a microscope in a Pathfinder workshop about island formations.

—Liz Kumabe photo

In Waiāhole Valley on O'ahu, educator Amy Leurson demonstrated field activities that included monitoring water temperatures in converging streams as part of understanding island aquatic ecosystems. (Inset) Community advocate and farmer John Reppun discussed local methods for growing wetland taro at his lo'i in Waiāhole Valley.

—P. Billig photos

Teachers toured the Hawai'i Institute of Marine Biology on Kāne'ohe Bay's Coconut Island where they heard about coral research and coral reef ecology.

—Liz Kumabe photo

Sea Grant Regional Coastal Processes Agent Rob Mullane discussed beach formation and nearshore processes with Pathfinder 4 teachers on Kailua Beach.

—Liz Kumabe photo

Reprinted from *Makai*, a newsletter of the University of Hawai'i Sea Grant College Program, Vol. 20, No. 8.

Resources Available By Request

The 14 resources listed are free to teachers and others interested in math and science education. Complete the order form below and mail it in. Your request will be filled in the order received as long as supplies last.

1. **The Annual Report of the Eisenhower Mathematics and Science Consortia and Clearinghouse 1998 (19 pages)**
   A report detailing the work of the Eisenhower Consortia and Clearinghouse in eight focus areas.
2. **The Formula for Success: A Business Leader's Guide to Supporting Math and Science Achievement (33 pages)**
   A report produced by the Business Coalition for Education Reform, this guide provides examples of how the business community can support increased math and science achievement.
3. **The Guidebook of Federal Resources for K-12 Mathematics and Science 1997-98, 4th edition (277 pages)**
   A national directory of Federal offices, programs, and facilities that support K-12 education in mathematics and science.
4. **Hawaii Directory of Informal Education Opportunities (48 pages)**
   A handy guide to mathematics and science educational opportunities in informal settings in Hawai'i. Listed are museums, zoos, nature centers, and other sites that encourage learning outside the classroom and school.
5. **Ideas that Work: Mathematics Professional Development (58 pages)**
   This volume contains descriptions of 15 professional development strategies, each illustrated with a real program example in which the strategy plays a major role. Also included are descriptions of successful staff development programs that combine several strategies.
6. **Informal Mathematics and Science Education (56 pages)**
   Featured are museums, parks, zoos, and aquariums in the continental United States that offer informal mathematics and science education facilities. Website addresses, where available, are included.
7. **Multicultural Approaches in Math and Science (42 pages)**
   This report contains a selection of multicultural materials and perspectives. Especially helpful may be contributions from educators who share their insights and discuss strategies.
8. **ENC Update, Fall 1998, Vol. 5, No. 2**
   A periodic newsletter by the Eisenhower National Clearinghouse for Mathematics and Science Education (ENC). Each edition contains order blanks for ENC products.
9. **Professional Development for Math and Science (36 pages)**
   The materials in this volume can be used in a variety of settings, from self study to group study, and in consultation with peers or supervisors. The resources may also be used in a research project of inquiry into practice.
10. **Teaching about Evolution and the Nature of Science (140 pages)**
    This National Academy of Sciences publication includes dialogues with fictional teachers who discuss the implications of ideas presented.
11. **Using Children's Literature in Math and Science (46 pages)**
    This may be a helpful volume for elementary staff teaching an integrated curriculum. The three sections cover how to locate information on children's literature; resource materials for teachers; and children's literature books for math and science.
12. **Reform in Math and Science Education (CD-ROM, Vol. 2)**
    This two-disc second volume from ENC features stories of teachers striving to implement innovative teaching methods in their school districts. Also included are original research papers on math and science education reform.
13. **Making Schools Work for Every Child (CD-ROM)**
    This CD-ROM is intended to serve as a resource for those concerned about educational equity in K-12 math and science education. The CD is divided into six major categories, including innovative programs and real-life stories and cases.
14. **Tools for Discussion: Attaining Excellence Through TIMSS (CD-ROM)**
    This CD-ROM presents TIMSS–an overview and highlights, a visual roadmap, the TIMSS resource kit, and additional tools and resources. General information about ENC and how to use the CD are also included.

Resource Order Form

Mail your completed request form to:

Pacific Mathematics and Science Regional Consortium
Ali'i Place ◆ 25th Floor ◆ 1099 Alakea Street
Honolulu, HI 96813

Please send me single copies of the free materials that I have circled below (available while supplies last).

1 2 3 4 5 6 7 8 9 10 11 12 13 14

Name: _____

Last 4 digits of SS#: _____
(for data tracking purposes only)

Position: _____

School or institution: _____

Mailing address: _____

_____

Phone: _____ **Fax:** _____

E-mail address: _____

PRESS: A Pathway to Success

continued from page 1

- Look carefully at the role that culture plays in school and community success
- Set a goal that everyone is committed to
- Choose strategies and practices that can increase learning in the goal area
- Make the practices and strategies fit the culture
- Identify and tap the resources and experiences of all partners to make the practices real in both school and community environments
- Monitor lessons as they are implemented to see whether adjustments and support are needed
- Assess the impact of school-community actions on learning and goal achievement
- Celebrate successes and determine future challenges

Schoolwide improvement becomes a reality when all stakeholders work together to achieve their vision for Pacific children.

Pacific Mathematics and Science Regional Consortium

PREL

PACIFIC RESOURCES FOR EDUCATION AND LEARNING

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The *Voyages in Mathematics and Science* production team welcomes comments about this publication and suggestions for the next issue. Please submit articles about successful mathematics and science programs, practices, activities, games, and puzzles to Paul Dumas, Pacific Mathematics and Science Regional Consortium, Pacific Resources for Education and Learning, Ali'i Place, 25th Floor, 1099 Alakea Street, Honolulu, Hawai'i 96813-4500.

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