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ABSTRACT

The National Diffusion Network (NDN) was established in 1974 through the Office of Educational Research and Improvement upon the belief that there are few difficulties encountered by school systems that have not been solved successfully in some other location. The primary function of the NDN is to disseminate information about a wide array of exemplary educational programs through which a local school system may solve its own unique problems without the necessity for starting from scratch. The term "exemplary program" is conferred only after a project has been approved by the U.S. Department of Education's Joint Dissemination Review Panel, recently renamed the Program Effectiveness Panel. This catalog contains descriptions of the exemplary mathematics education programs in the NDN, which are available to school systems and other educational institutions for implementation in their classrooms. Part I of the catalog contains the descriptions of 13 funded programs for K-12 mathematics instruction. Part II contains the descriptions of five nonfunded programs, which offer training and technical assistance through cost/service agreements negotiated with potential adopters. Part III contains contact details for the 50 state facilitators who can provide further information concerning any particular program, instructional materials and services about specific content areas, or professional development based on needs assessment from the prospective adopter. (JJK)

Mathematics Education Programs That Work

A Collection of Proven Exemplary Educational Programs and Practices in the National Diffusion Network

Office of Educational Research and Improvement
U.S. Department of Education

Mathematics Education Programs That Work

A Collection of Proven Exemplary Educational Programs and Practices in the National Diffusion Network

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Introduction

This catalog contains descriptions of the exemplary mathematics education programs in the National Diffusion Network (NDN). These programs are available to school systems or other educational institutions for implementation in their classrooms and can be used to achieve the National Goal for mathematics education issued by the President and the nation's governors in February 1990. Specifically, the goal reads as follows: **"By the year 2000, U.S. students will be first in the world in science and mathematics achievement."**

The term "exemplary program" is conferred only after a project has been approved by the Department of Education's Joint Dissemination Review Panel (JDRP) or the Program Effectiveness Panel (Pep). [The JDRP recently underwent reorganization and a name change. The new name of the review panel is the Program Effectiveness Panel. The titles JDRP and PEP are used throughout this catalog. If JDRP is used, it means that the project was approved for dissemination prior to 1987. PEP approval means approval during or after 1987.]

Approval by the Panel means that Panel members have examined objective evidence of effectiveness submitted by the developer of the program and are convinced that the program has met its stated objectives at the original development or demonstration site. In addition, the program developer has proved that the program will meet the educational needs of others in similar locations. Panel members recommend approval, and a date of validation is assigned. The PEP/JDRP number and approval date for each project can be found at the bottom of each project profile. Projects that continue development and submit additional evidence of effectiveness to the Panel carry two validation dates. In addition, some projects over four years old which have undergone the recertification process are identified at the bottom of the page with a recertification date. Should the reader be interested, evaluation information is available from the individual projects.

The National Diffusion Network is dedicated to helping local districts, intermediate service agencies, state departments of education, and postsecondary institutions in their continuing efforts to improve educational opportunities and achievement for all. To promote the transfer of successful programs from the development sites, the Department of Education supports the National Diffusion Network. The NDN is a nationwide system established to help those involved in education acquire the materials and assistance they need to incorporate proven exemplary practices into their own programs.

The NDN operates through three kinds of projects—Developer Demonstrators, Dissemination Processes, and Facilitators. Developer Demonstrators are exemplary projects that provide training, materials, and technical assistance to those who adopt their programs. The Dissemination Processes constitute the other category of exemplary programs. They provide information, instructional materials and services about specific content areas, or professional development based on needs assessments. NDN Facilitators (one in every state) are the principal links between Developer Demonstrators and those seeking new programs. Facilitators help to identify suitable NDN programs and assist with training and installation. A list of NDN Facilitators can be found on pages 29–34. Facilitators should be contacted for additional information on any program described in this catalog.

The National Diffusion Network was established upon the belief that there are few problems encountered by schools that have not been solved successfully in some other location. The primary function of the NDN is to disseminate information about approved programs so that an educational agency with special needs may choose from an array of programs a particular one that meets the agency's needs, philosophy and resources. By offering a wide variety of programs, the Network provides many options through which a local school system may solve its own unique problems without "reinventing the wheel."

Since its inception in 1974, the NDN has grown from 76 to over 440 programs that were developed in large part by classroom teachers. NDN programs have helped learners with many different needs-disabled preschoolers, disadvantaged inner-city children in primary grades, high achieving high school students, and out-of-school adults, to name a few. There are NDN programs for many content areas, ranging from the basic skills of reading, science, and oral and written communications to vocational and career education, consumer education, and physical education. Other NDN programs provide training for teachers in instructional methods and classroom management techniques. Still others help school administrators with a variety of management problems. In recent years, the NDN has responded to critical emerging national needs by identifying and making available exemplary practices in those areas.

Adopters of NDN programs range from small single classrooms in remote rural areas to large metropolitan districts. The impact of the NDN on American education has been enormous. The most recent statistics indicate that in the 1988-89 school year alone, over 29,000 public and private schools adopted NDN programs. All 50 states, the District of Columbia, Puerto Rico, and the Virgin Islands were represented. As a result, about 83,000 teachers and administrators received inservice training and an estimated 4.1 million students benefited.

A catalog describing all of the projects in the National Diffusion Network in greater detail is available for $11.95 plus $2 shipping from: SOPRIS WEST; 1140 Boston Avenue; Longmont, Colorado 80501; (303) 651–2829.

For further information on the National Diffusion Network or about these programs in mathematics education, please contact your State Facilitator, the Private School Facilitator, or Carolyn Lee, National Diffusion Network Program, Office of Educational Research and Improvement, U.S. Department of Education, 555 New Jersey Avenue NW, Washington, DC 20202–5645, or by telephone at (202) 219–2182.

Part I

Descriptions of Funded Mathematics Programs

CHAPTER 1 H.O.T.S. : Higher Order Thinking Skills Project. An alternative approach to Chapter 1 for grades 4-6 in which compensatory services consist solely of higher order thinking activities.

Audience Approved by PEP for Chapter 1 students in grades 4-6 in both reading and math. This program has also been used successfully with Chapter 1 students in grade 7, learning disabled in grades 4-6, and gifted in grades K-2.

Description The project replaces traditional drill and practice activities and content instruction in compensatory programs with thinking activities designed to generate the gains in basic skills expected from Chapter 1 programs. Students' thinking abilities and social confidence are improved in the process. The goal is to provide students with conceptual skills to learn the more sophisticated content of the upper elementary grade levels the first time it is taught in the classroom. The program is conducted in a lab, equipped with Apple computers, with a detailed curriculum and a teacher trained in Socratic dialogue techniques. Computers are used to enhance motivation and improve students' ability to self-monitor their own comprehension. The latter is enhanced due to the computer's ability to respond to students' ideas as fast as they can think of them. A detailed curriculum provides dialogues to improve the key thinking skills of metacognition, inference from context, decontextualization, and information synthesis. Students' increased abilities to articulate ideas and engage in sophisticated conversations enhance their language use and ability to learn content, with gains in both reading and math. The program operates as a pull-out. Students are in the program for 35 minutes a day, four days a week, for two years. In the first part of the period, the teacher engages students in sophisticated conversations. Students are then given a challenge to solve using the computer. They later discuss their findings, approaches, and results. Students proceed through the program sequentially, with no management system and no grades. Teacher judgment determines the pace through the curriculum. Success is demonstrated by products generated by each student, how they articulate their findings, and the results they record.

Evidence of Effectiveness As a result of participation in the program, Chapter 1 students in grades 4-6 improved their performance in reading and math to a greater extent than national averages and control groups, while also improving thinking ability as measured by the ROSS and "Inference from Context" measures. Improved self-concept and improved participation in content learning in the classroom were also evident. Studies were conducted in 11 schools encompassing a wide range of ethnic characteristics.

Requirements The program requires a computer lab and an experienced teacher who is trained in shifting from teaching approaches such as lecturing, refereeing, and linear sequencing to Socratic coaching techniques. A week-long workshop is provided to train teachers in these techniques. Ongoing costs will vary according to the number of students; whether part- or full-time staff is used, and the amount of the needed equipment the schools already have. Compared to Chapter 1 programs nationally that use experienced teachers, the overall cost of this program is less, even taking equipment costs into account.

Services Awareness materials are available at no cost. Project staff is available to attend out-of-state awareness meetings and for training and technical assistance (costs to be negotiated).

Contact **Dr. Stanley Pogrow, University of Arizona, College of Education, Tucson, AZ 85721. (602) 621-1305. FAX# (602) 621-9373.**

Developmental funding: U.S. Department of Education; Ford Foundation PEP No: 88-12 (7/13/88)

CLIMB: Coordinated Learning Integration - Middlesex Basics. A management program K-12 to improve student performance in reading/writing and mathematics.

Audience JDRP approved for students of all ability levels K-12, including Chapter I, special education, migrant education, and ESL.

Description The goal of Project CLIMB is to improve the performance of all students in reading, writing, and mathematics through the following components:

A coordinated program of instructiosn produced by teachers which includes:

- **Skills Arrays.** Identifies reading and mathematic skills K-12.
- **Writing Package.** Integrates reading-writing-thinking skills across the curriculum.
- **Survey and Criterion Referenced Tests.** Diagnoses and evaluates student performance.
- **Simplified Recordkeeping System.** Monitors continuous student progress K-12.

Training which prepares staff to implement the program in reading/writing, and/or mathematics. Training includes:

- use of the curriculum package,
- correlation of adopting district's curriculum materials, testing, and objectives to CLIMB skills arrays,
- teaching strategies and techniques —
  Mathematics training incorporates the NCTM standards and provides a "hands-on" fun approach to math.
- procedures for classroom implementation,
- content reading and study skills strategies for all disciplines, and
- follow-up training designed to meet the needs of adopting districts.

A management design which corrdinates and integrates personnel, materials, and services. Management design

- provides a design for communication between classroom instruction and support services;
- provides a system for coordination of instruction across grade levels,
- fosters a unified approach to achieve instructional goals, and
- delineates roles for project coordination.

Requirements Teachers and administrators participate in a two-day training for effective utilization for CLIMB curriculum and management design. A follow-up training session is recommended. Teachers must be supplied with the CLIMB curriculum materials. The program can be adopted in either reading/writing, and/or mathematics at any or all grade levels. The program can be adopted for the regular classroom, Chater I, special education, migrant education, and gifted programs.

Costs Start-up costs are approximately $40 to $160 per classroom teacher for curriculum materials and supplies. Maintenance costs are minimal. Training costs are negotiable.

Services Awareness materials are available at no cost. Visitors are welcome at project site any time by appointment. Project staff is available to attend out-of-state awareness meetings. Training is conducted at project site or adopter site. Implementation and follow-up services are available to adopters. All costs are negotiable.

Contact **Barbara Brenner, Director; Project CLIMB; Middlesex Public Schools; Administration Offices; Kennedy Drive; Middlesex, NJ 08846. (908) 968-4494.**

Developmental Funding: NJ TEEA R&D, USOE ESEA Title IV-C

JDRP No. 81-44 (1/28/82)
Recertified (9/85)

Comprehensive School Mathematics Program (CSMP). An exciting, complete elementary-level mathematics curriculum with a focus on problem-solving and developing critical thinking as well as teaching basic skills.

CSMP

Audience Approved by JDRP as a complete mathematics curriculum for students of all abilities, grades K-6. CSMP students do better in applying mathematics to new problem situations and in using various reasoning skills. They learn traditional mathematics skills and concepts as well as or better than comparable non-CSMP students, and they show a higher level of enthusiasm and interest in mathematics.

Description An underlying assumption of the CSMP curriculum is that children can learn and can enjoy learning much more mathematics than they do now. Unlike most modern programs, the content is presented not as an artificial structure external to the experience of children, but rather as an extension of experiences children have encountered in their development, both at the real-life and fantasy levels. Using a "pedagogy of situations," children are led through sequences of problem-solving experiences presented in game-like and story settings. It is CSMP's strong conviction that mathematics is a unified whole and should be learned as such. Consequently, the content is completely sequenced in spiral form so that each student is brought into contact with each area of content continuously throughout the program while building interlocking experiences of increasing sophistication as the situations become more challenging.

A feature unique to CSMP is the use of nonverbal languages that give children immediate access to mathematical ideas and methods necessary not only for solving problems, but also for continually expanding their understanding of the mathematical concepts themselves. Through these languages the curriculum acts as a vehicle that engages children immediately and naturally with the content of mathematics and its applications without cumbersome linguistic prerequisites. Other tools, such as the Papy Minicomputer, the hand-held calculator, various geometry tools, and random devices are used extensively throughout the curriculum to pose problems, explore concepts, develop skills, and define new ideas.

CSMP is flexible enough to facilitate whole-group, small-group, and individualized instruction. It is appropriate for all children including specialized audiences such as gifted, compensatory, and bilingual. It recognizes the importance of affective as well as cognitive concerns and has been developed and extensively tested in classrooms nationwide.

Requirements School systems and CSMP agree on an implementation plan that provides for the training of teachers, the evaluation of the program, and support services. The school system appoints a local coordinator who maintains contact with CSMP as a member of the CSMP Network.

Services Awareness materials are available at no cost. With advance notice, arrangements can be made for visitors to observe the program in use in a variety of sites. Project staff is available to attend out-of-state awareness meetings. Training is conducted at the project site or at the adopter site. Implementation and follow-up services are available to adopters.

Contact Clare Heidema, Director, CSMP, 12500 E. Iliff Ave., Suite 201, Aurora, CO 80014, (303) 337-0990.

Developmental Funding: USOE ESEA Titles III & IV, and National Institute of Education

JDRP No. 78-169R (3/17/78)

Recertified (3/13/84)

Computer-Assisted-Diagnostic-Prescriptive Program (CADPP) in Reading and Mathematics. An open, data base management system generating personalized educational plans (prescriptions) for a diagnostic/prescriptive approach to instruction.

Audience Approved by JDRP as a reading program for grades 3-9 and as a mathematics program for grades 3-7.

Description CADPP is a diagnostic/prescriptive approach to teaching. The CADPP software generates customized learner prescriptions and individualized educational plans. The relational open data base requires that the user load files with: 1) learning characteristics of individual students to include age, instructional level, identified learning modality; 2) a skills list or continuum; and 3) skill related characteristics of available instructional materials to include readability level, interest level, and learning modality. When the skills file, students file, and instructional materials file are loaded, customized prescriptions can be produced for each participating student, based upon the skills requested.

The CADPP software requires no programming skills and is menu driven. It can be used in all curriculum and content areas. The program can be utilized by one classroom teacher, a total program staff, or district wide. It has been used to meet the guideline requirements of ECIA Chapter 1 and Migrant Programs, competency based education programs, standards of learning, and special education programs.

Program effectiveness at the developer site is documented by a month and a half gain per month of instruction, utilizing the *SRA Achievement Series*, the *California Achievement Test*, and the *CADPP CRT Series*. Sustained gains studies support retention of gains. Adopting sites document similar gains. The goal of CADPP is "to aid the teacher in making an accurate diagnosis of student needs in reading comprehension and mathematics computation skills." The goal was developed to assist economically disadvantaged students in decreasing the educational gap between achievement test scores of the disadvantaged and non-disadvantaged students. This gap has historically been documented by the efforts of the ESEA Title I program in the 1970's and early 1980's (later referred to as ECIA Chapter 1). Although the initial goal of the program was directed to the disadvantaged student, the current utilization of CADPP in 47 states has drawn the attention of other populations. CADPP has been implemented by Adult Basic Education programs, Special Education programs, correctional institutions, hospitals for interned children, and community/junior colleges. This diversity of adopters has increased the scope of CADPP.

Requirements The software operates on the Apple II+, IIe, IIc, iigs, TRS 80 Models III, IV, and 1000, and IBM compatibles. The program requires a minimum of 64K, two disk drives, 80 column card, monitor and printer. The system is multi-user and not copy protected. The program disk has a capacity for 150 skills for two curriculum areas. The student file is limited to 100 students with the following characteristics: name, age, grade, gender, reading level, learning modality. The prescription file has a limit of 1,600 instructional activities per disk which can include: workbooks, computer software, audio-visual materials, games, basal programs, and teacher-made activities. The prescription file must be loaded by the user.

Services Awareness materials are available at no cost. Demonstration sites are available for visitation by appointment. Project staff and certified trainers are available to attend out-of-state awareness meetings; conduct training either at adopter site, or developer/demonstration sites; and to provide follow-up services at adoption site and/or through written correspondence and telephone consultation. Costs are negotiated for services that require travel for CADPP staff. A fee of $249 is charged for the CADPP software, which can be copied within the adopting district. Members of consortiums pay a $50 user's fee, and $249 is charged to the consortium. Updates and revisions are forwarded at no extra charge, and consultation from CADPP programmers and/or administration is included in this cost. The CADPP Criterion-Referenced Tests (optional material) are available at $3 a booklet, and are non-consumable.

Contact **Debra J. Roberson, Technology in Education Corporation, Inc.; 3936 West 78th Court, #21, Merrillville, IN 46410. (219) 769-1712.**

Developmental Funding: USOE ESEA Title I

JDRP No. 79-15 (6/12/79)
Recertified (12/84)

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Decision-Making Math (DMM). A program for improving students' capabilities in identifying, analyzing, and solving problems.

Audience Approved by PEP for students in 7th and 8th grade math classes and 9th grade General or Basic Math classes.

Description Decision-Making Math is a supplementary program designed to teach 7th, 8th, and 9th grade students a step-by-step plan in order to solve math problems successfully. DMM provides the teacher with an opportunity to isolate, teach, and then integrate into the curriculum, strategies that students need in order to solve problems both in and out of the classroom. A variety of methods is used to ensure understanding, such as: questioning and planning, interpreting and verifying, solving problems within a co-operative learning environment, organizing and manipulating data, and analyzing and applying solutions. All emphasis throughout the program and the training is on *process* rather than *solution*.

DMM was developed by the Educational and Technology Foundation to meet not only the needs of students so that they will be powerful problem solvers and effective decision makers, but also the needs of the teacher who wishes to create a problem-solving climate in the classroom. It is an evaluated program that has resulted in significant gains in student achievement as measured by the Comprehensive Test for Basic Skills (CTBS). The skill areas which are taught and applied in Decision-Making Math are currently recognized by foremost educational researchers as having critical importance for the nation's students.

Student Components of the program include:

- **Student Guide** which teaches students a four-step process of *Understand, Plan, Answer and Check*, while systematically guiding them through a series of problem-solving strategies.
- **Finding Facts** teaches students to draw facts from graphs, tables, charts, and maps. Students are then asked to develop, interpret, complete, predict, and compile data to design their own graphs.
- **Working After Graduation** presents students with a variety of career lessons so that they can see the applications of the math they are learning in the real world.
- **Working Together** has students working cooperatively using both mathematics and collaberative skills to solve non-routine problems.

All of these components are supplemented with a Teacher Manual, lessons plans, and a Supplement section which the teacher will find helpful when implementing the program.

Requirements DMM complements the regular math program. Adopting teachers must plan to use DMM for approximately one-fifth of their classtime. They should attend a full day of inservice, acquire one complete set of curriculum materials per teacher, and be able to duplicate student lessons. Teachers will be able to evaluate student performance with a CRT. Analysis of the CRT results is provided by DMM for first-year adopters. A restructuring of the curriculum is not required for implementation.

Services The initial cost is the one-time purchase of the DMM Curriculum materials which includes the DMM Binder, 16 Student Workbooks, and 128 Strategy Practice Cards for $99.00. One-day inservice training is available and recommended. After the inservice, teachers are ready for classroom implementation. Additional costs include a consultancy fee, travel time, and travel and per diem expenses.

Contact **Co-Directors Laura Dunn and Kristine A. Shaff; Education and Technology Foundation; 4655 25th Street; San Francisco, CA 94114; (415) 824-5911.**

Developmental Funding:

JDRP No. 87-10 (6/1/87)

Effective Videodisc Instruction in Core Mathematics Concepts. A project designed to improve math achievement with diverse groups of learners by enhancing instruction through the use of videodiscs and print materials.

Audience Approved by PEP for students of all ability levels in grades 5-7, including remedial, mainstreamed, and mildly handicapped students.

Description The program enhances the ability of teachers to provide instruction in mathematics through the classroom use of videodiscs. The technology is used to emphasize prerequisite skills, providing systematic review and guided practice in small steps.

The teacher, using a handheld remote control, conducts the videodisc lesson while monitoring and supporting students. Videodisc demonstrations are briskly paced, with intensive questioning. Each lesson has five to seven major checkpoints; if students are experiencing difficulty, the teacher can provide additional guided practice through the videodisc. To ensure an emphasis on concept development rather than rote learning, two or three sets of parallel examples are available for reteaching.

The combination of quickly paced video demonstrations, intensive questioning, and increased presence of the teacher on the classroom floor all enhance academic learning time.

Each videodisc program consists of videodiscs, student workbooks, and a teacher's manual. Workbooks are primarily used for independent practice. During the interactive videodisc activities, most of the written student responses are made in notebooks. Student interaction is intensive, and demonstrations are rarely more than 30 seconds before a written response is required.

Evidence of Effectiveness Implementation of the program has consistently and substantively improved student achievement when compared with pre-existing instructional programs. The program has shown considerable strength in addressing the needs of low achievers and mildly handicapped students. The program has supported regular classroom teachers' efforts to teach special education in the regular classroom.

Requirements Color television and videodisc hardware are required to implement the program. No additional personnel are required. Training is provided in the cost of purchasing the materials.

Costs Most Grade 5 implementation would use the fractions and decimals program, with a total of four videodiscs containing intense instructional support for more than 50 hours of instruction. Higher grades would add the 40-hour, three-disc word problems program. The typical Grade 5 costs would be $2,600 per building (three to four fifth grade teachers) and include the videodiscs, teacher's manual, 35 fractions workbooks, 35 decimals workbooks, and permission to copy workbooks. Videodisc players are $400-$650, and a color television monitor is needed. As a volume discount, a free videodisc player will be provided with every seven discs ordered.

Services Staff development (included in the cost of materials) involves an initial two- hour training session and an individual follow-up visit with the teacher during the second week. Included in each videodisc program is a placement test to check on skills development, a tool which can be used for management and monitoring.

Contact **Alan Hofmeister, Technology Division, Developmental Center for Handicapped Persons, Utah State University, Logan, UT 84322-6800. (801) 750-3718.**

Developmental funding: Federal Office of Special Education Programs PEP No. 89-11 (5/17/89)

First Level Language (Kindersay). A program designed to facilitate oral language acquisition and an understanding of the basic language concepts and relationships needed to succeed in the more complex tasks of math and reading.

Audience Approved by PEP for pre-primary students in pre-kindergarten, kindergarten, kindergarten, and transitional first grade, including those with developmental lags and learning disabilities.

Description The program is viewed as a basic part of a total language program and would naturally be accompanied by other informal language experiences. It provides a sequential curriculum and management system that provides for individual developmental growth and learning of basic language skills in conceptual language, auditory discrimination, and auditory memory. A child may work through as many as 72 lessons to reach advanced objectives. The step-by-step, closely sequenced lessons afford the child frequent experiences of success because higher level objectives are pursued when mastery of preceding skills is established.

The curriculum is based on knowledge of developmental theory and cognitive growth. Lessons represent a three part continuum: receptive language, expressive language, and concept-related activities. The sequenced objectives are also presented in strands so that the child does not reach an impasse in instruction due to a particular area of difficulty.

Instructional periods take place on a daily basis for a period of 20-30 minutes. Children are grouped for instruction depending on their determined starting levels; there are typically three to four groups in a classroom The well-documented lessons describe procedures and are accompanied by appropriate materials.

Evidence of Effectiveness After one year in the program, participants demonstrated statistically significant and educationally meaningful gains relative to national norm groups and local comparison groups on three different measures of language-concept development.

Requirements The program requires no special staff or facilities. A maximum of one day of staff training is required.

Costs Cost for start-up per student is $5.40 for materials. Training costs are negotiable.

Services In addition to training and materials, follow-up technical assistance is available if necessary. Monitoring and evaluation procedures are also provided. Awareness materials are available at no cost.

Contact **Mary A. Felleisen; PRIMAK Educational Foundation; 38 North Waterloo Road (P.O. Box 701); Devon, PA 19333. (215) 687-6252.**

Developmental Funding: PRIMAK Educational Foundation. PEP No. 88-11R2 (2/13/90)

First Level Mathematics (Kindermath). **A comprehensive program in math fundamentals using concrete objects and actual physical operations for initial math instruction.**

Audience Approved by JDRP and PEP for children in their first year of mathematics instruction, kindergarten or first grade.

Description The program is diagnostic/prescriptive in nature, providing a sequential curriculum for individual developmental growth. The ninety lesson curriculum consists of the following nine components: same and different; patterns; sets zero to five; shapes; sets six to ten; numerals six to ten; signs; and addition/subtraction. Key elements of the program are developmental hierarchies, mixed instructional modes, low child-teacher ratio, and extended curriculum range.

The program has been designed to be used by both regular and special education teachers. Because it is available in Spanish, it is also appropriate for use in bilingual and ESL programs.

The entire program is also available for the computer. The 13-disk system is tutorial in nature, uses a voice synthesizer, and may be utilized without the assistance of the teacher.

As a result of participation in the program, children in their first year of mathematics instruction demonstrated statistically significant growth in knowledge of mathematics relative to national norms on three standardized tests of mathematics achievement.

Requirements Program may be implemented in an individual classroom, a single school, or a district. Teachers wishing to implement the program and management system should attend a training workshop, which is most often held at district or regional sites. Administrators and para-professionals are also encouraged to attend training sessions. A training tape, complete with training manual, is available for use by those who prefer this type of workshop.

One *Kindermath* kit is required per classroom. Software for the program (if desired) exactly matches the lessons in the original kit.

Services Awareness materials are available at no cost. Visitors are welcome by appointment at project site and additional demonstration sites. Project staff is available to attend out-of-state awareness meetings. Training is available at project site or adopter site (costs to be negotiated). Implementation and follow-up services are available to adopters (costs to be negotiated).

Contact **Mary Alice Felleisen; 38 North Waterloo Road, Devon, PA 19333, (215) 687-6252.**

Developmental Funding: PRIMAK Educational Foundation

JDRP No. 84-1 (1/24/84)
Recertified (2/13/90)

IMPACT: Improving Minimal Proficiencies by Activating Critical Thinking. A Staff Development Project to integrate critical thinking skills into and across content areas.

Audience Approved for students grades 6-9, and effectively used by teachers of students at all grade levels (K-college), subject areas, and ability levels, but especially with at-risk students.

Description Learning the mechanics of basic skills is not enough. Real competency requires training in critical thinking. IMPACT focuses on staff training to infuse the direct teaching of critical thinking into existing curriculum. IMPACT's instructional approach has three essential components: a framework of 22 critical thinking skills; a model lesson format; and 10 teaching behaviors that activate student use of critical thinking. The training materials model proven methods for associating subject-matter content with such thinking skills as Comparing and Contrasting, Classifying, Ordering, Patterning, Identifying Relevant and Irrelevant Information, Cause and Effect relationships, Predicting, and Logical reasoning. Program validation has shown that IMPACT students significantly ($p>.05$) outperform similar control students in mathematics applications, reading comprehension, and critical thinking skills after only one semester in the program. The IMPACT Universe of Critical Thinking Skills, 10 teaching techniques, and lesson format are presented in six consecutive sessions of the IMPACT Level I seminar. Sessions include:

- Review of literature and research. /Demonstration of technique
- Group interaction /Lesson simulation

During Level I training, experts demonstrate ten teaching behaviors that encourage and reinforce thinking skills (e.g. cuing, probing, and reflection with wait-time). Trainees receive supervised practice for lesson reinforcement and integration. Following the seminar, participants further develop their skills by:

- Teaching the thinking skills listed in the IMPACT Universe of Critical Skills.
- Practicing the teaching strategies with their students.
- Observing each other teach IMPACT lessons in the classroom.
- Receiving/Reviewing feedback on the peer-observation findings.
- Creating original IMPACT based lessons.

Teachers easily integrate the three key IMPACT components into their instructional program by first adapting sixty model practice lessons based on either language arts or mathematics and then creating their own lessons. The curriculum materials, available only to IMPACT graduates, demonstrate both planning and instructional elements. The planning elements include: the identification of the thinking skills implicit in the standard curriculum, the prerequisite thinking skills, the behavioral objective, materials and equipment. The lesson design, based on the Hunter model, incorporates the instructional elements of Orientation, Direct instruction, Guided-practice and Closure.

Requirements IMPACT training occurs at two levels. For classroom implementation, the project recommends that a district enroll a team of at least two teachers and their site administrator in Level I training, an intensive 18-hour inservice (3-day) that models the infusion of the IMPACT approach. To become a Level II District/Site Trainer, a Level I graduate must have (1) been appointed by the district; (2) taught 20 IMPACT lessons; (3) filed a plan to disseminate IMPACT within the district for two years; and (4) completed a Level II seminar.

Services Awareness materials are available at no cost. With advance notice, arrangements can be made for visitors to observe the program in use at demonstration sites located nationwide. Project personnel is available to make out-of-state Awareness Presentations. Training is conducted nationally at the project site, adopter sites and pre-arranged advertised locations. Training registration fees are pre-set annually on the basis of pro-rated cost recovery. Technical assistance, follow-up and evaluation services also are available to adopters on a cost-recovery basis.

Contact **Current information about training locations and fees may be obtained by contacting Phi Delta Kappa; Eighth St. & Union Ave., Box 780, Bloomington, IN 47402-0789; (812) 339-1156; or S. Lee Winocur, Ph.D., National Director, IMPACT; Center for the Teaching of Thinking; 21412 Magnolia Street; Huntington Beach, CA 92646; (714) 964-3106.**

Developmental Funding: USOE ESEA Title IV-C JDRP No. 83-17 (3/8/83) 87-24 (6/12/87)

Sci-Math. A supplement to the science or mathematics curriculum, usable in grades 7 through 12, that teaches problem—solving skills by using labelled rates for factor analysis, stretching and shrinking, and percent.

Audience Approved by JDRP for average to above- average students in grades 7-10, low achievers including educationally disadvantaged students taught at a slower pace in grades 7-12.

Description Sci-Math uses the mathematics of rates and ratios to simplify and unify problem-solving in science, mathematics, and everyday life. The material is available in two modules. The first contains no algebraic variables and is appropriate for all students from 7th grade math through physics. The second should be studied after the first and should be used with students who are confident in their use of algebraic variables. The program was developed by Dr. Madeline P. Goodstein at Central Connecticut State University with the support of the National Science Foundation.

Central Theme: The technique known as factor analysis, dimensional analysis, or labelled rates is presented in careful steps, showing all possible pitfalls in using the method, and showing how to avoid—or correct—them. The technique should be viewed by mathematics teachers as a necessary step-up in sophistication, since many problems involving rates can be solved in one large step, rather than in a series of small problems whose answers eventually may cancel each other. The method is particularly valuable with calculators. It also is valuable in demonstrating the difference between calculation and problem-solving.

Applications: The goal is to have students use labelled rates so that they become a life skill. Mathematics in everyday living involves and applies these same rate concepts in consumer purchasing, business, crafts, and industry. The Sci-Math approach to proportions enables even Piagetian pre-formal students to understand proportions and apply them to problem-solving.

Activities: There are 23 hands-on activities in the course. They all deal with situations familiar to students and relate to home, play, school, and business. Materials used are readily available and inexpensive: rulers, string, pennies, spoons, jars, masking tape.

Teacher Support: A Teacher's manual is available for each of the two modules, with all problems worked out in detail. The manuals also provide record sheets, data, and answers to questions for the activities.

Time Requirement: Sci-Math can be used in many different formats, as a separate unit or as a parallel course. For advanced algebra, chemistry, or physics, a small group or individuals may study the modules in less than two weeks. For less advanced or younger classes, teachers may spend a quarter of the year or only a few weeks, depending on the depth of learning they hope to achieve. It is important that all teachers realize Sci-Math does not add material to their courses; instead, Sci-Math shows students new and efficient ways to solve problems that are already part of the course.

Requirements Sci-Math can be used in any classroom. Student modules and teacher guides are available at approximately $7 per copy from a commercial publisher. Materials are non-consumable and can be reused several times, making them cost-effective. Material costs for experiments and activities are minimal.

Services Awareness materials are available at no cost. Project personnel is available for one-hour awareness presentations, or training workshops of 4 to 6 hours. Costs for these services, as well as evaluation and follow-up, are negotiated with the sponsoring organization.

Contact **James P. McAuliffe, Sci-Math Director; Education & Technology Foundation; 4655 25th Street; San Francisco, CA 94114. (415) 824-5911.**

Developmental Funding: National Science Foundation

JDRP No. 82-20 (5/12/82)
Recertified (6/86)

SITE: Successful Inservice through Turnkey Education. A mathematics inservice program for the development of higher-level thinking skills through the use of manipulative materials.

Audience Approved by JDRP for elementary school teachers and supervisors (grades 2-6) and students of these participants.

Description The SITE program is based on a problem-solving approach to learning new mathematical concepts and skills. Unlike other mathematics inservice programs, SITE integrates content and methodology, using hands-on activities with a variety of manipulative materials. Since teachers "teach as they were taught," the program uses processes and activities which are immediately applicable in the classroom as the instructional model. SITE activities are readily integrated into the existing school mathematics curriculum and mesh with every textbook. SITE addresses 12 of 13 standards for curriculum and evaluation, (particularly the geometry and measurement strands) identified by the National Council of Teachers Mathematics. Specific instruction is provided in mathematics (fractions, decimals, percent, area, perimeter, volume, metric measurement graphing, estimation) and in process skills (cooperative grouping, questioning strategies, guided discovery). The project provides the printed instructional materials as well as the mathematics equipment needed to implement the program.

Evaluation of process and content is continuous, from initial training through classroom implementation with students. The project has demonstrated its effectiveness in urban, suburban, and rural schools. Teachers' mathematical knowledge increases substantially, while enthusiasm and skill in teaching math is noticeably enhanced. Student growth in knowledge from pre- to post-test has been significant (at 0.05 level).

Project SITE may be adopted at one of two levels.

Direct Training for Classroom Teachers (15-20 hours over 3-4 days) includes: Mathematics content and teaching strategies described above. Teachers implement the SITE program with students.

OR

Training the Trainer (20-30 hours over 4-6 days) includes: (1) everything described above and (2) Training skills (i.e. workshop organization and leadership, brain dominance and learning styles and the psychology of the adult learner). Trained participants act as turnkey trainers for other teachers in their schools or districts and implement the SITE program with students.

Costs *Direct training for classroom teachers*–honorarium, travel, and per diem costs for SITE trainer(s): $40.00 per participant for workshop materials; one SITE Starter Kit for each adopting building: $415.00, includes shipping and handling. *Training the turnkey trainer*–$20.00 per participant for workshop materials.

Requirements The program can be adopted by a district, a school, or an individual teacher. *Classroom Teacher Adoption:* minimum of three full days of SITE training; classroom implementation with students for 20-40 hours; pre- and post-testing of students. *Turnkey Adoption:* minimum of three full days of SITE training and one full day of Trainig the Trainer; turnkeys conduct SITE inservice for other school or district teachers totaling 10-15 hours; classroom implementation with students by each trained teacher for 20-40 hours in the classroom; pre-/post-testing of teachers and students is expected.

Services First-level awareness materials are available at no cost. Visitors are welcome by appointment at the demonstration sites in East Meadow and New Rochelle, NY. Project staff is available to attend out-of-state awareness meetings (cost to be negotiated). Training is conducted at adopter site. Implementation and follow-up services are available (costs to be negotiated).

Contact **Dr. Barbara Berman or Dr. Fredda J. Friedswitzer, Co-directors; Project SITE; Educational Support Systems, Inc.; Staten Island, NY 10314. (718) 698-3636; FAX (718) 370-3102.**

Developmental Funding: USOE Metric Education Program

JDRP No. 82-27 (5/27/82)
Recertified (6/5/86)

STAMM: Systematic Teaching And Measuring Mathematics. A comprehensive outcome-based mathematics program for students of all ability levels.

Audience Approved by JDRP for students of all abilities, grades K-8. The program also has materials available for usage with grades 9-12.

Description *Systematic Teaching and Measuring Mathematics* (STAMM) presents an elementary mathematics program that covers the curricula and the means necessary to assist in delivering NCTM's "Standards". Teachers can select from a variety of learning activities to provide for the needs of their students through a variety of concrete manipulatives, practice, problem solving, and enrichment strategies. STAMM provides students with varied opportunities to develop underlying concepts, and can be used in a variety of teaching styles (large group, cooperative grouping, departmentalization, individualized or labs) with any basal textbook. STAMM's flexible design fits into schools of all sizes and classroom structures.

STAMM includes a managment system which is organized around carefully designed learner outcomes. Student growth is monitored through post assessment strategies. Specifically, the program is delivered through the following STAMM materials:

- **Teacher Manual** (TM) - a resource book of *activity* oriented ideas to assist the teacher in delivering the learner outcomes.
- **Student Booklet** - a set of student materials from which a teacher selects activities as needed to enhance development and practice of the learner outcomes by the students *after* they have received initial instruction.
- **Student Assessment Booklet** - criterion-referenced assessments to provide information about the student's progress on the learner outcomes utilizing alternative testing strategies.

These STAMM resource materials have been created to complement the exising textbooks, manipulative materials, and teacher-made resources.

Similiar products have been developed having the basic STAMM components for secondary students. Program and materials can service regular as well as Chapter I, special education, and gifted/talented students.

In the host district, over 75% of the students tested (grades K-8) scored above the national norm on the Comprehensive Test of Basic Skills. Prior to STAMM, approximately half the students scored above the national norm.

Requirements The STAMM resource materials necessary for using this program include a teacher manual for each level or course taught, student booklets and student assessment booklets. STAMM materials may be used by a single teacher or an entire school system. The more levels involved in implementation, the greater the gains. A two-day training session prior to implementation is necessary for teachers and the immediate supervisor.

Services Awareness materials are available at no cost. Visitors are welcome at project site by appointment. Project staff is available to attend out-of-state awareness meetings as well as to discuss STAMM by telephone. Training is conducted at project site or at adopter site. Implementation and follow-up services are available to adopters. Costs for said services to be reimbursed by requesting institution.

Contact **Sherry Stumbaugh, STAMM Project Director; Jefferson County Schools; 1005 Wadsworth Boulevard; Lakewood, CO 80215. (303) 231-2381.**

Developmental Funding: USOE ESEA Title III

JDRP No. 76-87 (6/23/76)
Recertified (12/84)

Success Understanding Mathematics (SUM). A comprehensive mathematics program which uses concrete objects and questioning techniques to develop understanding.

Audience Approved by JDRP for grades 2-6. The program also has components in use with grade 1.

Description The program was designed to increase the level of mathematics achievement of children who were achieving below the level expected. The project materials and teaching techniques are appropriate, however, with students of all ability levels. Direct instruction is emphasized to facilitate student interaction in their development of concepts. Teaching strategies described in project manuals are based on Jean Piaget's research about the way children learn mathematics, specifically elementary school children's difficulty with abstract thought and their consequent need for concrete materials. Teachers guide students to develop mathematics concepts as students move objects to solve problems. Computational algorithms are developed through objects to solve problems. Drill follows but does not precede understanding.

Some unique characteristics of *Success Understanding Mathematics* include:

(1) Program materials can be used with any commercial text.

(2) Planning for instruction is matched to student needs.

(3) Objectives for mathematical skills include a problem-solving strand.

(4) Criterion-referenced tests for the objectives and recordkeeping materials are available.

(5) Parent involvement and an on-going inservice program provide support for teachers.

Chapter 1 students have made proven advances measured by the mathematics batteries of the *Metropolitan Achievement Test* and the *Iowa Test of Basic Skills*. Mean annual gains scores have ranged from 6.6 NCE's (Normal Curve Equivalency) to 13.0 NCE's.

Requirements The program may be implemented by a teacher, school, supplementary program, or an entire district. Adopters will be invited to visit a demonstration site, to name a local project coordinator/contact person, to provide release time for teachers and administrators to participate in 1 or 2 days of pre-service training, to ensure that the key elements including the teaching strategies and on-going inservice will be implemented, to evaluate student achievement, and to provide information about the adoption.

Services Awareness materials are available at no cost. Project publications are furnished to adopters at cost. Visitors are welcome anytime by appointment at the project site. Project staff is available to attend awareness meetings. Training is available at project site or adopter site. (Costs to be negotiated.) One day pre-service training is required; two days pre-service training is preferred. One or two days follow-up implementation training scheduled three to four months later and a one day on-site follow-up visit at year end are recommended. (Costs to be negotiated.)

Contact **Kathleen Bullington, Project Director; Success Understanding Mathematics, Des Moines Public Schools; 1800 Grand Avenue, Room 317B, Des Moines, IA 50309. (515) 242-7860.**

Developmental Funding: USOE ESEA Title I

JDRP No. 80-55 (2/11/81)
Recertified (1/85)

Part II

Descriptions of Nonfunded Mathematics Programs

A word about nonfunded programs. . .

All of the programs, funded and nonfunded, have been validated by either the Joint Dissemination Review Panel (JDRP) or the Program Effectiveness Panel (PEP). Unfunded programs are able to offer training and technical assistance through cost/service agreements negotiated with potential adopters.

Academically Talented Youth Programs (ATYP), Mathematics. A program of accelerated instruction in mathematics for junior high school students with exceptional mathematical ability.

Audience Approved by the JDRP for academically gifted 7th to 9th grade students who have obtained a score of 500 or better on the mathematics portion of the *Scholastic Aptitude Test* (SAT). A score of 870 or better on the mathematics plus verbal section.

Description *The Academically Talented Youth Program* (ATYP) mathematics component provides accelerated mathematics instruction for 7th to 9th grade students with excellent mathematical ability. The purpose of the ATYP is to identify those students with exceptional ability and to provide appropriate instruction in mathematics. The collaboration between K-12 school districts and higher education institutions permits the ATYP to identify students with exceptional ability in public and non-public school districts and to provide accelerated instruction at a higher education institution for qualified students. First year placement in the ATYP program of accelerated mathematics instruction covers the standard two-year high school algebra curriculum of Algebra I and Algebra II, plus introductory work in probability and trigonometry. Instruction, often by college and university professors, emphasizes the conceptual and theoretical framework of mathematics. The class is composed of a homogeneous group of students of the same age and ability. Instruction occurs in one 2-1/2 hour class held each week during the school year. Course grades and high school credit recommended by the instructor are granted by the home school.

Requirements Successful replication of the ATYP model is possible in any community in which there are multiple school districts within a 50-mile radius of a post-secondary institution. This educational community must be willing to depart from traditional roles to commit to the adoption of the critical elements of the ATYP program, specifically, student identification, student and family counseling, instructor and site selection, program administration, and inter-institutional cooperation. The collaboration of K-12 school districts and higher education institutions is essential. School districts agree to release the student 2-1/2 hours a week to ATYP mathematics instruction and to grant high school mathematics credit for completed courses. Higher education institutions provide instructors release time, teaching assistants, and classroom space. Both a qualified project administrator and mathematics instructor are necessary for the success of the program. Classes should be limited to 15-20 students. Textbook and equipment expenses are minimal.

Major expenses of the program are shared by the originating schools and the higher education institution (Kalamazoo College) so that financial outlay of students' families will be minimal. Salaries for a program director and for one instructor of 15-20 students are the largest recurring costs when these responsibilities are not assigned to existing positions. Teaching assistants are college students in a federally subsidized work/study program. Textbooks and standardized tests are re-used. The annual search for students requires postage, materials, and personnel time. Estimated costs for the installation year are $6,536, with a cost of $327 to the student. Costs for the subsequent year are $3,911, with costs to the student equalling $196.

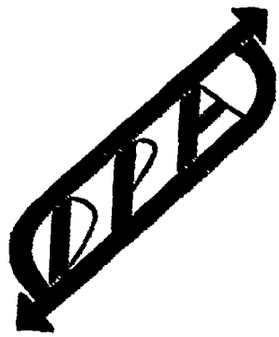
Services Awareness materials are available at no cost. Visitors are welcome at the project site by appointment. Project staff is available for awareness sessions (cost to be negotiated).

Contact **Carol R. McCarthy, Director; Academically Talented Youth Programs, Mathematics; Kalamazoo College; 1200 Academy Street; Kalamazoo, MI 49007; (616) 383-8550, 383-8468.**

Developmental Funding: Private Foundations

JDRP No. 86-9 (6/25/86)

Diagnostic Prescriptive Arithmetic (DPA). A basic arithmetic program with emphasis on developing, modeling and mastering the basic concepts and skills.



Audience Approved by JDRP for students functioning at grade levels 3-5. This program has been used in other settings with grade levels K-6.

Description DPA is a Project developed and written by Matthew Scaffa in Staten Island Schools. It is a process oriented program emphasizing the development and refinement of teacher modeling and questioning skills. DPA is an arithmetic program and includes counting, place value, addition, subtraction, multiplication, and division of whole numbers. Problem-solving skills are developed and reinforced through ongoing experiences with estimation and approximation, data collection, organization and interpretation, and real-life applications of arithmetic skills. Diagnostic tests for the major arithmetic topics (three levels) are used throughout the year to determine students' strengths and weaknesses both in concepts and skills. Prescriptions are then planned using the DPA Teacher's Manual, manual supplement, and other DPA resource materials. Each of the concept- developing and reinforcement activities in the Teacher's Manual has specific objectives related to the arithmetic instructional sequence and the diagnostic test items. The manual also includes descriptions of ongoing mathematics experiences, recordkeeping procedures, classroom management techniques, and instructions for developing a variety of teacher-made materials.

DPA can be used in self-contained elementary grade classes as the arithmetic component of the mathematics program or as a co-curricula remediation program (PSEN; Chapter I). Both approaches are essentially the same. A topic section of the DPA diagnostic test is administered, and the results are analyzed for group and/or individual needs. These data are recorded on the analysis chart, which aids the teacher in forming instructional groups and planning a program. Each student begins at his/her level of understanding. He/she may work with or without the teacher in a large group, small group, or independently. The student may use concrete materials for modeling a basic concept and may work with a DPA activity for reinforcing a new skill. The student may complete a written activity for practice or may help in the school by applying arithmetic to a real-life situation. This is a concept-based program that uses manipulative and physical materials and is adaptable to special education students.

Requirements A district must take the following steps: request training or awareness session; provide for the release of participating teachers for training; purchase necessary materials; and encourage cooperative planning and exchange among teachers.

Services Awareness materials are available at no cost. Visitors are welcome anytime by appointment at various demonstration sites. Project staff is available to attend out-of-state awareness meetings (costs to be negotiated). Training is conducted at project site (adopter pays only its own costs). Training is also available at adopter site (costs to be negotiated). Follow-up services are available to adopters (all expenses must be paid). Start-up costs for curriculum and testing materials are about $7 per pupil or $200 per classroom or resource teacher.

Contact **Bonnie Hawthorne, Kessler School District #2; 2420 Choteau; Helena, MT 59601 (406) 442-0150 or Sally Logan; 417 N. Main, Louisiana, MO 63353 (314) 754-5953**

Developmental Funding: USOE ESEA Title I

JDRP No. 74-68 (9/18/74)
Recertified (11/84)

Individualized Prescriptive Arithmetic Skills System (IPASS). A computerized criterion-referenced testing and instructional program in basic mathematical skills utilizing microcomputers.

Audience Approved by JDRP as a supplementary mathematics program for grades 5 and 6. Developed as, and is an ongoing Chapter I program.

Description IPASS was designed to increase the achievement of intermediate grade students in mathematics through the use of advanced technology in the form of microcomputers. IPASS employs microcomputers and specially designed software as an integral part of both instruction and the management of student progress in a compensatory education setting. IPASS is an efficient and highly cost-effective project.

IPASS includes locally developed criterion-referenced tests, instructional and management software, cross-referenced tests, cross-referenced instructional resource file, and guides for teachers and students. IPASS objectives can be used to supplement most mathematics curricula without modification.

IPASS is designed as a "pull-out" program in which the student receives two 30-minute sessions per week. IPASS can be adapted to a classroom or laboratory setting. A teacher or aide using two microcomputers can serve up to 40 students per week. Locally developed instructional materials can be integrated into the remediation process. IPASS is available for R/S TRS-80 models III and IV, R/S Color disk (32K) Apple IIe IBM/Compatibles. Cassette version no longer available. Adopted in more than 120 school districts in 20 states. Original funding Chapter I. Evaluation data is available upon request.

Requirements An approved microcomputer and printer must be available. A training program is required for school personnel implementing the program. No prior experience with computers is necessary.

Costs A fee of $250 is charged for the IPASS software, including computer programs, criterion-referenced tests, student profile sheets, instructional resource file, and procedure guides for teachers and students. One copy of these materials is included and permission is given to reproduce any and all of these materials and programs in quantities necessary for the adopting school district.

Services Demo diskette for IBM/Compatibles, Model III, IV and color Apple IIe available $20. Awareness materials available at no cost. Visitors are welcome at any time by appointment. Project IPASS staff members are available to explain and demonstrate IPASS both at in-state and out-of-state awareness meetings (cost to be negotiated). Training is conducted at the project site and is also available at an adopter site (cost to be negotiated). Implementation and follow-up services are available (costs to be negotiated). Telephone hot-line is available to adopter districts at any time during normal hours.

Contact **Robert R. Reynolds, Director; Project IPASS; Pawtucket School Department; Park Place; Pawtucket, RI 02860. (401) 728-2120.**

Developmental Funding: USOE ESEA Title I

JDRP No. 82-23 (5/27/82)
Recertified (6/5/86)

Sound Foundations. A program developed to improve the achievement and attitude of high school remedial mathematics students by presenting concepts in the context of topics of interest to the age level.

Audience Approved by PEP for students and teachers in high school remedial, general, and basic skills math programs. Junior high schools and middle schools may also use the simulation in their seventh and eighth grade programs.

Description Sound Foundations replaces the traditional math curriculum for the target students but retains the traditional textbook for student practice. The program covers topics in the remedial math program by using a simulation format. Major topics include integers, rational numbers, graphing, measurement, geometry, probability, statistics, and consumer mathematics.

Sound Foundations is divided into ten milestones in a job simulation about a rock band: formation, equipment purchase, reharsal, dance clubs, record sales, airplay, publicity, local concerts, away concerts, and the national tour. Students are given a budget of $41,000 and must use creativity, management skills, and math concepts to successfully guide the band financially. Managers receive quality points based on their decisions. Students learn new math topics as they are needed in the simulation and work independently of each other.

The program includes a student book, teacher's manual, five decks of activity cards, 111 daily quiz masters, transparency masters, and test masters. An annual exchange of ideas occurs every fall in a newsletter circulated to users of the program.

Evidence of Effectiveness Remedial math students using the program show a greater increase in mathematics achievement and a positive increase in attitude towards success in mathematics, learn not to stereotype math as a male domain, and elect more quantitative courses in high school. Female students demonstrate a more positive attitude toward the usefulness of mathematics. Use of the program has increased the percentage of students passing state competency tests required for graduation.

Requirements A training workshop is required. A careful mix of structure and informality is also encouraged in the classroom.

Costs Costs for the program are $9 for a teacher's envelope (which lasts for years) and $8 per student book (which is consumable).

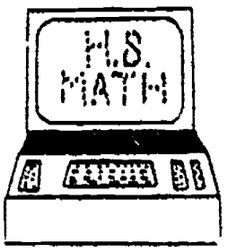
Services Awareness materials are available at no cost.

Contact **Robert Gerver, North Shore High School; 450 Glen Cove Avenue; Glen Head, NY 11545. (516) 671-5500.**

Developmental funding: Local.

PEP No. 90-05 (2/6/90)

Utilizing Computers In Teaching Secondary Mathematics. Program of microcomputer-based instructional materials and techniques to improve mathematics skills.



Audience Unanimous approval by JDRP for students of all skill levels, grades 9-12. Program materials also successfully used in grades 7-8 and 13-14.

Description This project's goal is to improve mathematics skills through the use of microcomputer-based instructional materials and techniques. The project's package consists of two teachers' manuals and six disks containing approximately 70 computer programs which encompass six areas of secondary level mathematics—Algebra I & II, Geometry, Trigonometry, Calculus, and Applied Mathematics. While some programs are tutorial in nature, others are drill and practice or simulations using graphics. The programs can easily be integrated into any traditional math curriculum without the need to hire any additional staff.

A typical approach to implementing the project materials is to introduce the topic of study using traditional methods of instruction. Students are then instructed to access the specific computer programs designed to apply the concept or skill and obtain detailed explanations and instructions as to how to proceed with independent investigations utilizing the information provided. During this time, the teacher serves as a resource person providing individualized assistance. A follow-up discussion is held at the end of the class period and work is assigned from the text or from a worksheet generated from the computer program.

Focus Math enhancement for students and an alternative teaching tool. During the training, emphasis is placed on curriculum and program integration for long-term implementation into a school system.

Requirements No additional or special staff is necessary to replicate the project. Approximately four hours of training are required. Training arrangments must be made through the project staff.

Services Awareness materials are available at no cost. Training is available at adopter site (all expenses, plus trainer's fee must be paid). Implementation and follow-up services are also available to adopters (trainer's fee and expenses must be paid). A fee of $150 is charged for the teachers' manuals and computer programs which are available. For further information contact project staff listed below.

Contact Monika Steinberg, Project Director, or Elizabeth Ann Pagen, Project Manager; UCTSM; Educational Information and Resource Center (EIRC), 700 Hollydell Court, Sewell, NJ 08080. (609) 582-7000. FAX (609) 582-4206

Developmental Funding: USOE ESEA Title IV-C

JDRP No. 82-17 (4/29/82)
Recertified (6/18/86)

Part III

Facilitators

State Facilitators

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Ms. Joyce Lazzeri, State Facilitator
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