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ABSTRACT

This report summarizes the Specialized Teacher Project of the Miller Mathematics Improvement Program funded by the state of California. The project provides inservice training workshops in mathematics for elementary school teachers. These teachers are then encouraged to provide specialist instruction in mathematics for their own class and one other class at the same grade level by means of a trade-off of teaching assignments. The objectives and procedures for these workshops are included, and three phases of the 1969-1970 research are reported. Phase One examines the cost effectiveness of varying the instructor participant ratios in the workshops. Phase Two compares the achievement of classes for different socio-economic levels of the communities involved. Phase Three compares pupil achievement of classes taught by teachers who commuted to workshops with those taught by teachers who resided on campus during the workshops. Results of the three analyses are reported. Teacher training had a positive effect on pupil achievement in mathematics, particularly in grade two in low socio-economic areas. For a related document, see ED 047 950. (JH)

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RESEARCH REPORT
OF THE
SPECIALIZED TEACHER PROJECT
1969-1970

One of the
Mathematics Improvement Programs
Authorized by
California Education Code Section 5799

California State Department of Education

June 1971

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**The Specialized Teacher Project Was Financed
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INTRODUCTION

The California State Department of Education's consultant in mathematics, Mrs. Bryne Bessie Frank, has written a summary of the Specialized Teacher Project. This summary serves as an excellent introduction for this report as it describes the past, present, and future plans of the Specialized Teacher Project. We are grateful to Mrs. Frank for allowing us to reproduce the summary.

February 2, 1971

Summary Report
of the
SPECIALIZED TEACHER PROJECT
One of the
MILLER MATHEMATICS IMPROVEMENT PROGRAMS
By
Bryne Bessie Frank

BACKGROUND

The Specialized Teacher Project is one of four Mathematics Improvement Programs established by the 1967 session of the California State Legislature. Authored by the late Senator George Miller, Jr., the legislation, incorporated in California Education Code Section 5799, provides ways of strengthening mathematics instruction in the State's elementary and secondary public schools. It authorizes the development of a test and establishes three pilot projects to begin in 1968. The Specialized Teacher Project, originally authorized as a three-year pilot project, has been extended by 1970 legislation for an additional three years until 1973-74.

DESCRIPTION

The Specialized Teacher Project provides state funds for ten-day summer inservice training workshops in mathematics for elementary school teachers. These teachers are encouraged subsequently to provide instruction in mathematics for pupils in their own and one other class at the same grade level by means of a trade-off or exchange of teaching assignments.

The summer training stresses individualized learning experiences, the techniques employed in using mathematical possibilities in the environment and physical materials in a mathematics laboratory setting. The philosophy of education reflected is similar to Madison Project (Robert Davis, Syracuse University), The Nuffield Mathematics Project of Great Britain, and many other projects in the United States and abroad which rely on an active learning approach. The Specialized Teacher Project is operated by the Office of the San Diego County Superintendent of Schools under terms of a contract with the California State Department of Education.

PARTICIPATION AND EVALUATION

In 1968 summer training was given to 130 second and fifth grade teachers from 48 districts. Results of pre- and post-testing of pupils in their experimental and comparison classes showed that the teacher training had a very strong effect on pupils' mathematical achievement in grade two, particularly on those pupils from low socio-economic areas.

In grade five, the effect was more limited with achievement gains significant in certain new topics introduced in the summer training.

In 1969, 858 teachers from 336 districts received summer training including 87 "second year" participants. An analysis of the results of pre- and post-testing during the 1969-70 school year revealed that pupils whose teachers received in-service training scored significantly higher on measures of comprehension and computation. Again, the project was particularly effective with pupils from low socio-economic areas. Both second and fifth grade pupils made significant gains on nine of the ten scales measured. When the trade-off feature of the project is employed, the number of pupils who profit from the project naturally is doubled.

In the summer of 1970, 1136 teachers of grades two, three, five, and six, representing 343 districts, received training. Of these, 180 teachers who had attended previous workshops received three weeks of leadership training. Pre-tests were given to pupils in October 1970 and post-tests will be given in May 1971.

For the summer of 1971, there will be opportunities for 1200 teachers, grades one through six. The faculty for the workshops will be responsible for about 30 interns who have demonstrated leadership potential in previous summers. Additionally, and at district expense, opportunities for training will be extended to about 150 supervisors and administrators.

FUNDING

All costs for training teachers are borne by the State including stipends, travel and living expenses, and instructional materials which become the property of the district and are to be used by the specialized teacher in the classroom. All expenses incurred for training supervisors and administrators including the cost of instructional materials, shall be borne by the districts.

All inquiries about the project should be directed either to Leonard M. Warren, Director, Specialized Teacher Project, 6401 Linda Vista Road, San Diego CA 92111, or Mrs. Bryne Bessie Frank, Consultant in Mathematics, Bureau of Elementary and Secondary Education, State Department of Education, Sacramento CA 95814.

RESEARCH DESIGN

Definition of Terms

"Participants" are those classroom teachers who attended the workshops.

"Teachers" are those classroom teachers who did not attend the workshops, but whose classes were used as research controls.

"Workshops" and "inservice programs" are used synonymously.

"Instructors" are those persons who conducted the workshop classes.

As outlined in Mrs. Frank's summary, the 1968-69 Research Study of the Specialized Teacher Project demonstrated that an inservice training program for mathematics teachers can significantly improve pupil achievement in mathematics. The 1969-70 research built upon and added to the preceding year's study in three phases. The first phase of the 1969-70 study was directed toward determining cost effectiveness by means of varying the instructor-participant ratios of the 1968-69 inservice program. Five separate inservice program formats were studied, each with its appropriate control class whose teachers did not attend the workshop (VI).

- (I) One-week workshop in a single district followed by five Saturday workshops at two-week intervals during the fall. Instructor-participant ratio, 2-20.
- (II) Two-week workshop for second-year participants. Instructor-participant ratio, 2-20.
- (III) Two-week workshop for first-year participants. Instructor-participant ratio, 2-20.
- (IV) Two-week workshop for first-year participants. Instructor-participant ratio, 2-32.
- (V) Two-week workshop for first-year participants. Instructor-participant ratio, 4-150.

The second phase of the 1969-70 study was made by dividing the classes according to the socioeconomic level of the community designated as low, medium, or high. The third phase of the study compared pupil achievement of classes taught by participants who commuted each day to a workshop to pupil achievement of participants who resided on campus.

Testing Program

A battery of tests covering concept understanding, computational ability, and attitudes towards mathematics was administered in the fall shortly after the beginning of instruction. A similar battery was administered near the end of the school year.

In grade 2 the battery consisted of basic tests of mathematical comprehension and computational ability. Each of the concept and computational tests was modified by removing some of the elementary questions and substituting more advanced questions to provide the battery for the spring testing program. In grade 5 selected scales from the National Longitudinal Study of Mathematics Achievement (NLSMA) series of tests were used for both the fall and end-of-year testing programs. These tests covered understanding as well as computational ability in the areas of whole number operations, operations with fractions, and informal geometric ideas. A special achievement test covering graphs, functions, and probability was administered in the spring. These particular areas had been emphasized in the inservice training and in the instructional program for the fifth grade. In grade 5 a selected set of attitude scales was also administered in both the fall and spring testing programs.

A list of the test scales is given in Appendix B.

FINDINGS AND CONCLUSIONS

The research design of the study and the methods of statistical analysis are discussed in the following section of this report. The basic data of the statistical analysis are presented in the tables of Appendix A. The general conclusions of the study are summarized in this section.

- (1) The data for 1969-70 support and strengthen the finding from the 1968-69 study that the inservice program provided to participants the two-week workshops had a positive effect on the mathematics achievement of their pupils. The data also confirm the 1968-69 finding that the inservice program is more effective in grade 2 than in grade 5. (Tables 1, 4, 7, 9.)
- (2) In grade 2 the two-week inservice programs were most effective in increasing the pupils' understanding of mathematics. The classes taught by participants in the inservice program had scores on the second level comprehension scale which were nearly 20 percent higher than the scores of the control classes. The classes scored only 2 percent higher on the computation scales. (Table 1.)
- (3) In grade 5 the two-week inservice programs produced significantly better pupil performance in several areas of mathematics achievement, although the effects were not large. The participants' classes had scores about 5 percent higher than the control classes. There were no overall significant differences in performance on any of the attitude tests scales. (Table 7.)
- (4) The different instructor-to-participant ratios did not produce measurable differences in pupil performance. (Tables 3, 8.)
- (5) In the school district where the inservice education was organized as a one-week summer workshop followed by five Saturday workshops at two-week intervals during the fall, the classes did not perform as well as did the classes under the two-week inservice plans. In fact, the overall performance of these classes was below that of the control classes. It is not clear that this indicates a weakness of the organizational plan since there may have been other factors present in the particular district responsible for the observed results. However, this organization plan is being implemented in another school district for the 1970-71 research to clarify this point. (Tables 1, 2, 7, 8.)
- (6) The experimental classes and their controls were also classified according to three socioeconomic levels. In general, the differences between the

experimental and control classes were most marked for the medium and low socioeconomic groups. Except for a few scales, the difference was largest for the low socioeconomic group. Hence the 1969-70 study supports the finding of the 1968-69 study that the inservice training is particularly effective for classes in disadvantaged areas. This analysis was one of the few which showed an appreciable difference on some attitude scales. There was a highly significant difference between the socioeconomic groups in response to the scale measuring attitude toward arithmetic, fun versus dull. Furthermore, the inservice classes from the low socioeconomic group had the highest adjusted score on this scale. This affords some objective evidence that the inservice education had a positive effect on the attitude of the pupils toward mathematics (Tables 4, 9.)

- (7) In two of the inservice groups, the teachers were about equally divided between those who commuted each day to the workshop and those who lived at the workshop center. Since this factor has a bearing on the cost of operating a workshop, the data were analyzed to determine what effect this factor might have on student achievement. No significant differences were found between the classes taught by the commuting and non-commuting teachers in both grade 2 and grade 5. (Tables 5, 10.)

Statistical Analysis

The class means for each of the fall and spring test scales constituted the basic statistical data of the study. The effect of each of the factors was determined by means of analysis of covariance. The fall scores were covariates while the spring scores served as independent variables. The analysis provided mean cell scores for each dependent variable adjusted on the basis of regression on the fall scores. In this way the analysis compensated for the differences which existed between classes at the beginning of the school year.

The following analyses were made for both grade levels:

1. One-way analysis for inservice categories I, II, III, IV, V, VI
2. One-way analysis for inservice categories I, II, III, IV, V
3. One-way analysis for inservice categories II, III, IV, V
4. Two-way analysis with two categories of inservice (two-week workshop, no inservice) and three socioeconomic levels
5. Two-way analysis with two categories of inservice (III, IV) and two levels of the commuting factor.

The cell sizes (number of classes) were as follows:

TABLE 1

Inservice

	I	II	III	IV	V	VI
Grade 2	16	22	14	32	174	259
Grade 5	20	25	15	37	192	289

TABLE 2

Socioeconomic

High

Medium

Low

	Inservice	Control	Inservice	Control	Inservice	Control
Grade 2	21	21	188	200	33	38
Grade 5	29	30	216	231	24	28

TABLE 3

Commuting Factor

Commuting

Non-commuting

	III	IV	III	IV
Grade 2	6	21	8	11
Grade 5	10	23	5	14

The tables of adjusted mean scores with the associated F-values are given in Appendix A.

INSERVICE PROGRAM

The objectives of the inservice workshops were:

- to provide an open atmosphere in which participants could learn to use more effectively the mathematics materials presently in the classroom.
- to explore with participants the implications of the 1967-68 Strands Report of the Statewide Mathematics Advisory Committee.
- to teach the participants more mathematics than they had classroom need for in a setting that applied it directly to the teaching situation.
- to use the methodologies of the Madison Project and the Nuffield Program, which put emphasis on laboratory approaches, intuition, and child development.
- to bring out the theories of Piaget.
- to develop better participants who could in turn develop better pupils.
- to develop an inservice format that accommodates the maximum number of participants at a minimum cost without sacrificing the quality of the workshops' procedures.
- to teach participants in the same way they are expected to teach pupils.
- to use master classroom teachers where possible as the project instructors.
- to implement the 1967-68 Strands Report of the Statewide Mathematics Advisory Committee.
- to use an eclectic approach with existing materials, not to create new ones.
- to develop a corps of experienced leaders for mathematics education in the State.
- to involve children in the workshops' demonstration lessons.
- to allow participants to learn with children.
- to encourage participants to work with pupils on an individualized basis and in small groups.
- to effect a positive attitude change toward mathematics in the pupils.
- to relate mathematics to the real world and the pupils' immediate environment.

- to demonstrate the open-endedness of mathematics.
- to create the responsibility for one's own learning; intrinsic motivation, self direction.
- to allow participants a "hands-on" workshop experience where a major amount of time is devoted to participant involvement through discovery lessons, construction of materials, laboratory experiences consisting of manipulative aids, gaming techniques, and a low-pressure environment.
- to allow for "incorrect" responses as a means of finding correct solutions.
- to allow for as many success experiences as possible.
- to achieve a greater amount of meaningful verbalization among the participants in place of stand-up lecturing by the instructor.
- to articulate the mathematical content among the grades and be aware of cognitive levels.
- to integrate the lessons of the workshop with the State-adopted textbook.

Inservice Formats

- I. Two instructors with 20 first-year participants representing all elementary schools in one district.

This format was implemented in one school district where there were trained participants in every school. The format included both a grade 2 and a grade 5 participant from each school. Approaches that could have been used in this format that were not so readily applicable to the other inservice formats were:

- A. the "buddy system" — the two participants from each building had the opportunity to share experiences.
- B. all of the participants from each of the schools could have formed a committee to share ideas.
- C. a different training period as the participants met every day for one week before school opened in the fall with five Saturday follow-up sessions after school opened.

- II. Two instructors with 20 second-year participants. These sections were designed to find out if a second year of training would cause a greater increase in pupil achievement than one year of training. (This was not a

two-year longevity study as the participants taught different children the second year.)

- III. Two instructors with 20 first-year participants. These sections were designed as a comparison with the first year's format to see if the results would be the same. Demonstration classes of children were available for trying out various lessons learned by the participants.
- IV. Two instructors with 32 first-year participants. These sections were designed to see whether a larger ratio between instructors and participants would affect pupil achievement.
- V. Four instructors with 150 first-year participants. These sections further increased the instructor-participants ratio. Team and cooperative teaching organizations were used. A set of five one-half hour video tapes were especially designed for these sections.

Workshop Staffs

Because of the emphasis on improving classroom performance of participants and because of previous success with Madison Project workshops, experienced teachers who had had previous inservice training responsibilities were selected as instructors for the workshops. As was discovered later, this feature of the workshop was greatly appreciated by the participants because they were able to develop rapport with their instructors quite easily.

Instructors selected for the grade 2 participants were:

Mrs. Janet Abbott, Supervisor, Chula Vista School District
Mr. William Aho, Supervisor, Walnut Creek School District
Mrs. Francis Burns, Teacher, Escondido School District
Mrs. Mary Dahle, Teacher, Los Angeles City Schools
Mrs. Sarah Golden, Teacher, Chula Vista School District
Mr. Samuel Lipman, Resource Teacher, Cajon Valley School District
Mrs. Marion Pasternak, Teacher, Los Angeles City Schools
Mr. Jerry Regnier, Teacher, Los Angeles City Schools
Miss Marilyn Rehwald, Teacher, Los Angeles City Schools
Mr. George Wright, Principal, Chula Vista School District

Instructors selected for the grade 5 participants were:

Mrs. Joan Akers, Teacher, Santee School District
Mr. George Arbogast, Principal, Los Angeles City Schools
Mr. James Burton, Teacher, Oceanside School District
Mr. Edward Fecko, Teacher, Rancho Santa Fe School District
Mr. Bonnie Rae James, Teacher, Los Angeles City Schools
Mrs. Gail Lowe, Teacher, Los Angeles City Schools

Mr. John Otterness, Mathematics Specialist, Los Angeles City Schools
 Mrs. Audrey Oyer, Teacher, Lemon Grove School District
 Mr. George Vojtko, District Resource Teacher, San Diego Unified School District
 Mr. Charles Wilbur, Teacher, Los Angeles City Schools
 Mr. Alberto Beron, Teacher, Los Angeles City Schools

Selection of Participants

General guidelines for the Specialized Teacher Project were sent from the State Department of Education in March 1969 to all county superintendents of schools, elementary school district superintendents, and elementary school principals in the State. Districts were invited to submit applications for pairs of teachers for the project. (One teacher became the workshop participant and the other became the control teacher for the research design.) From these applicants, random, arbitrary assignments were made to the various inservice formats. Geographical representation was effected through involvement of participants from 336 districts. From these districts 858 teachers were selected for inservice workshops at three locations in the State — Long Beach, Hayward, and Norwalk. The list of school districts and participants is given in Appendix C.

Workshop Schedule and Activities

In order that the three workshops be as much alike as possible, careful planning by the staff was necessary. This was accomplished by one week of planning prior to the first workshop. Lesson plans for the two-week workshops were based on the objectives of the workshop and were followed for each workshop. Analysis and evaluation of the materials and the concepts led to careful structuring of the all-workshop days yet allowed a great deal of flexibility within the classrooms. Separate classes geared to second or fifth grade were set up. The daily schedule for the classes was developed as follows:

8:30 - 9:30	Instruction
9:30 - 10:00	Break
10:00 - 11:00	Instruction
11:00 - 12:00	Instruction
12:00 - 1:00	Lunch
1:00 - 2:00	Instruction
2:00 - 2:30	Break
2:30 - 3:30	Instruction
3:30 - 4:30	Staff Meeting

The daily staff meeting created a reporting system which gave immediate feedback on means of implementation of the original lesson plans developed during the planning week.

Follow-up Activity

A follow-up session was held for the workshop participants during the month of February. The main objectives of the session were to answer questions of the participants and to reinforce the concepts taught during the summer. The exchange of ideas that occurred during the question period was beneficial. Problem area topics had been solicited from the teachers in advance.

FINANCIAL CONSIDERATIONS

One of the major determinations to be made was a cost effectiveness study of each of the inservice formats. This study was somewhat simplified by the fact that the performance of the inservice classes was relatively the same for four of the five formats. Therefore, a comparison can be made simply on the costs for each format.

Inservice Format Costs

Instructor/Participant Ratios

- I. 2/20 all one district
- II. 2/20 second-year
- III. 2/20 first-year participants
- IV. 2/32 first-year participants
- V. 4/150 first-year participants

TABLE 4

Total Number of Participants

	I	II	III	IV	V	Totals
Long Beach	--	56	38	56	280	430
Hayward	--	31	--	53	288	372
Norwalk	56	--	--	--	---	56
TOTALS	56	87	38	109	568	858
Cost/format	\$ 17,952	\$ 29,154	\$ 13,092	\$ 35,094	\$ 176,016	
Cost/partcpt	\$ 321	\$ 335	\$ 345	\$ 322	\$ 310	

RECOMMENDATIONS

It can be determined that the large group, team-taught format (V) was the most cost effective. However, the instructors said that 150 participants were too many, but that the format would probably be feasible with a ratio of 4/100. Other costs such as per diem for participants could be eliminated if a district conducted a workshop of this nature that involved only the district's own teachers.

APPENDICES

APPENDIX A

Tables of Adjusted Mean Scores

APPENDIX A

Tables of the adjusted mean scores and associated F-values are listed below. F-values which are significant at .05 and .01 levels are denoted by * and ** respectively.

GRADE 2

TABLE 5

Inservice Program (I-VI)

	I	II	III	IV	V	VI	F
SRA	13.33	14.13	15.46	13.97	14.29	12.67	* 3.00
Low Compreh.	2.27	2.45	2.45	2.43	2.43	2.28	** 5.14
High Compreh.	7.35	8.13	8.36	8.03	8.03	7.52	** 6.82
Low Comput.	7.18	7.85	7.75	7.55	7.88	7.58	* 2.90
High Comput.	8.78	9.38	9.27	9.07	9.43	9.08	2.16

TABLE 6

Inservice Program (I-V)

	I	II	III	IV	V	F
SRA	13.31	14.11	15.73	14.00	14.41	0.67
Low Compreh.	2.30	2.47	2.44	2.45	2.44	0.72
High Compreh.	7.43	8.19	8.38	8.09	8.08	1.63
Low Comput.	7.26	7.90	7.79	7.60	7.94	2.09
High Comput.	8.87	9.45	9.31	9.11	9.50	1.35

TABLE 7

Inservice Program (II-V)

	II	III	IV	V	F
SRA	14.14	15.65	14.01	14.36	0.51
Low Compreh.	2.47	2.43	2.44	2.44	0.06
High Compreh.	8.18	8.33	8.07	8.05	0.32
Low Comput.	7.88	7.76	7.58	7.91	0.96
High Comput.	9.42	9.28	9.11	9.47	0.76

TABLE 8

Socioeconomic

	High		Medium		Low		F-Ins.	F-S/E
	Inserv.	Control	Inserv.	Control	Inserv.	Control		
SRA	14.85	13.00	14.44	12.87	13.02	11.31	** 6.91	* 2.93
Low Compreh.	2.40	2.23	2.44	2.29	2.40	2.24	** 11.81	0.69
High Compreh.	7.87	7.55	8.13	7.54	7.68	7.27	** 8.90	* 3.24
Low Comput.	7.66	7.86	7.84	7.60	7.74	7.21	1.98	1.74
High Comput.	9.14	9.54	9.41	9.10	9.16	8.65	0.69	2.47

TABLE 9

Commuting Factor

	Commuting		Non-commuting	
	III	IV	III	IV
SRA	16.16	14.19	15.36	13.10
Low Compreh.	2.39	2.40	2.42	2.49
High Compreh.	8.26	8.09	8.20	7.87
Low Comput.	7.94	7.44	7.73	7.52
High Comput.	9.43	9.33	8.93	9.06

GRADE 5

TABLE 10

Inservice Program (I-VI)

	I	II	III	IV	V	VI	F
Act. Arith. S. C.	20.22	19.40	19.97	19.66	19.92	19.99	0.38
Ideal Arith. S. C.	25.09	25.98	26.13	25.27	25.91	25.90	0.58
Arith. Fun/Dull	9.10	8.70	9.13	8.78	8.82	8.90	0.26
Arith. Hard/Easy	24.33	22.80	23.71	23.79	23.74	23.88	0.95
Debil. Anxiety	33.10	32.28	33.91	32.51	33.06	33.19	0.58
Dec. Notation	3.01	3.36	3.13	3.06	3.05	2.99	1.88
Translation	3.93	4.50	4.39	4.38	4.25	4.13	*2.75
Work with Nos.	4.41	5.01	4.88	4.88	4.79	4.58	**3.32
Geom. Info.	3.15	3.14	3.33	3.06	2.96	2.84	*2.91
Whole Nos. Oper.	3.46	4.19	4.40	4.24	4.35	4.13	*3.79
Whole Nos. Comp.	6.40	7.19	7.84	7.62	7.65	7.32	**4.36
Fractions-Comp.	1.80	2.25	2.33	2.26	2.04	2.07	*2.98
Graphs, Prob., Fns.	4.99	5.29	5.26	5.19	5.08	4.91	*2.24
Comprehension	10.98	11.98	12.07	11.89	11.67	11.29	*2.63
Computation	8.21	9.21	10.17	9.85	9.69	9.37	**3.87

TABLE II

Inservice Program (I-V)

	I	II	III	IV	V	F
Act. Arith. S. C.	20.23	19.37	19.93	19.69	19.91	0.41
Ideal Arith. S. C.	25.11	25.06	26.13	25.38	26.00	0.63
Arith. Fun/Dull	9.12	8.69	9.10	8.80	8.81	0.29
Arith. Hard/Easy	24.30	22.78	23.64	23.73	23.68	0.91
Debil. Anxiety	32.88	32.28	33.86	32.49	33.09	0.54
Dec. Notation	3.04	3.38	3.16	3.08	3.07	1.54
Translation	3.91	4.52	4.39	4.41	4.27	* 2.41
Work with Nos.	4.43	5.02	4.88	4.89	4.81	1.57
Geom Info.	3.17	3.14	3.32	3.06	2.97	1.24
Whole Nos. Oper.	3.47	4.23	4.43	4.29	4.39	**4.27
Whole Nos. Comp.	6.39	7.24	7.85	7.67	7.70	**4.77
Fractions-Comp.	1.80	2.26	2.34	2.27	2.06	**3.59
Graphs, Prob., Fns.	4.99	5.26	5.24	5.20	5.10	0.52
Comprehension	11.00	12.01	12.04	11.92	11.73	1.33
Computation	8.20	9.28	10.17	9.91	9.76	**4.44

TABLE 12**Inservice Program (II-V)**

	II	III	IV	V
Act. Arith. S. C.	19.34	19.91	19.66	19.88
Ideal Arith S. C.	26.12	26.18	25.44	26.06
Arith. Fun/Dull	8.70	9.10	8.82	8.82
Arith. Hard/Easy	22.79	23.65	23.74	23.69
Debil. Anxiety	32.36	33.94	32.59	33.15
Dec. Notation	3.41	3.19	3.10	3.10
Translation	4.55	4.42	4.45	4.30
Work with Nos.	5.06	4.93	4.94	4.86
Geom. Info.	3.16	3.35	3.09	2.99
Whole Nos. Oper.	4.26	4.46	4.32	4.41
Whole Nos. Comp.	7.29	7.90	7.71	7.74
Fractions Comp.	2.28	2.36	2.29	2.08
Graphs, Prob., Fns.	5.30	5.28	5.24	5.13
Comprehension	12.12	12.14	12.03	11.83
Computation	9.34	10.25	9.98	9.82

F

0.39

0.42

0.17

0.81

0.73

1.90

1.18

0.52

1.44

0.28

0.92

*** 2.77**

0.51

0.41

1.01

Socioeconomic

High

Medium

	Inserv.	Control	Inserv.	Control	
Act. Arith. S. C.	19.05	19.35	19.88	20.00	2
Ideal Arith S. C.	27.13	25.97	25.75	25.98	2
Arith. Fun/Dull	8.28	8.55	8.80	8.91	
Arith. Hard/Easy	23.54	23.42	23.61	23.90	2
Debil. Anxiety	33.56	33.81	32.86	33.26	3
Dec. Notation	3.55	3.13	3.06	3.00	
Translation	4.62	4.33	4.28	4.18	
Work with Nos.	5.32	4.69	4.80	4.64	
Geom Info.	3.45	3.14	2.96	2.83	
Whole Nos. Oper.	4.33	4.27	4.27	4.14	
Whole Nos. Comp.	7.64	7.39	7.54	7.35	
Fractions Comp.	2.22	2.37	2.08	2.04	
Graphs, Prob., Fns.	5.51	5.08	5.09	4.95	
Comprehension	12.94	11.75	11.67	11.40	1
Computation	9.85	9.72	9.59	9.36	1

Low

Inserv.	Control	F-Ins.	F-S/E
20.31	20.48	0.37	* 3.22
25.42	25.36	0.69	1.86
9.67	9.26	0.00	**5.02
24.29	24.24	0.02	1.20
33.54	32.37	0.13	0.71
2.88	2.88	* 4.11	**7.78
4.34	3.73	**12.13	**4.60
4.76	4.19	**17.62	**4.98
3.07	2.65	** 9.10	**7.71
4.89	4.06	** 7.71	1.99
8.47	7.17	**10.85	1.72
2.31	2.10	0.19	**5.42
5.16	4.56	**12.68	* 3.57
11.66	10.35	**16.72	**7.73
10.82	9.18	** 8.45	2.49

TABLE 14

Commuting Factor

	Commuting		Non-commuting	
	III	IV	III	IV
Dec. Notation	3.23	3.17	3.20	2.81
Translation	4.24	4.50	4.80	4.15
Work with Nos.	4.84	4.99	4.96	4.69
Geom. Info.	3.39	3.04	3.42	3.06
Whole Nos. Oper.	4.23	4.86	4.37	4.33
Whole Nos. Comp.	7.61	7.85	8.18	7.60
Fractions Comp.	2.42	2.30	2.12	2.10
Graphs, Prob., Fns.	5.11	5.44	5.17	5.13
Comprehension	11.91	12.16	12.40	11.30
Computation	9.97	10.14	10.41	9.75

APPENDIX B

Test Scales

APPENDIX B

TEST SCALES

GRADE 2

<u>Scale Name</u>	<u>Test Form</u>
SRA Total Score	SRA Primary Form D
Lower Comprehension	Grade 2 Computation Form (Spring)
Higher Comprehension	Grade 2 Computation Form (Spring)
Lower Computation	Grade 2 Computation Form (Spring)
Higher Computation	Grade 2 Computation Form (Spring)

GRADE 5

<u>Scale Name</u>	<u>Test Form</u>
Actual Arithmetical Self Concept	NLSMA Grade 5 Battery (Fall, pp 4-10)
Ideal Arithmetical Self Concept	NLSMA Grade 5 Battery (Fall, pp 4-10)
Arithmetic, Fun vs. Dull	NLSMA Grade 5 Battery (Fall, pp 4-10)
Arithmetic, Easy vs. Hard	NLSMA Grade 5 Battery (Fall, pp 4-10)
Debilitating Anxiety	NLSMA Grade 5 Battery (Fall, pp 4-10)
Decimal Notation	NLSMA Grade 5 Battery Section II (Spring)
Translation	NLSMA Grade 5 Battery Section II (Spring)
Working with Numbers	NLSMA Grade 5 Battery Section II (Spring)
Geometry - Informal	NLSMA Grade 5 Battery Section II (Spring)
Whole Numbers - Operations	NLSMA Grade 5 Battery Section II (Spring)
Whole Numbers - Computation	NLSMA Grade 5 Battery Section II (Spring)
Fractions - Computation	NLSMA Grade 5 Battery Section II (Spring)
Graphs, Probability, Functions	NLSMA Grade 5 Battery Section II (Spring)
Comprehension	NLSMA Grade 5 Battery Section II (Spring)
Computation	NLSMA Grade 5 Battery Section II (Spring)

APPENDIX C

List of Participants by District

**SPECIALIZED TEACHER PROJECT
MILLER MATHEMATICS IMPROVEMENT PROGRAMS**

**Teacher Participants
1969-70**

ALAMEDA COUNTY

<u>School District</u>	<u>School</u>	<u>Participant</u>
Alameda Unified	Haight	Cowell, Juliette R. Nyatt, Sheila
	Nastick	Costedost, Frances M.
Berkeley Unified	Columbus	Schaeffer, Marilyn J.
	Franklin	McCarthy, Betty M.
	Hillside Pri	Jensen, Norman C.
	Jefferson Elem	Duda, Lampi L. Furuichi, Mary A. Johnson, Georgia L. Wise, Jean
	John Muir	Hearther, Marieme
	La Conte	Fry, Sue
	Oxford	Braxton, Beverly
	Tilden Pri	Hata, Harrie N.
	Washington	Starck, Juanita R.
	Whittier Univ	Christeson, Iris
Castro Valley Unified	Chabot Elem	Bowhen, Patricia R.
	Clifton	Johnson, Steven B. Wescott, Michael L.
	Independent	Conner, Bill P.
	Marshall	Sherman, Clinton F.
	Parsons	Appleton, Marion G. Mielke, Mary A.
	Proctor	Boggs, Ann J.
	Sydney	McLaughlin, Marsha Pullman, Winifred P. Willey, Marilyn
	Schultz, Barbara P. Turiel, Arleen	
Fremont Unified	Grimmer	Willer, Margery A.
	Green	Heebner, Judith
	Durham	Jacobs, Martin L.
	Mattos	Tingley, Danvil P.
	Henry Elem	Culbertson, Ella M.
	T. Rix	Hodgkins, Elizabeth Z.
	Potter, Kenneth Jr.	
Hayward Unified	Argonaut	Kelly, Marjorie C.
	Burbank Elem	Smith, Shirley J. Voeks, Kay

School District**School****Participant****Hayward Unified (Cont'd.)****Cherryland**

Burton, Betty L.
 Ramirez, Margaret
 Sullivan, Dorothy
 Boyd, Mary E.
 Norum, Betty
 Roper, Alvin E.
 Condos, Themios
 Flaherty, Cornelia M.
 Margolis, Bernice
 Valentine, Mary V.
 Proitt, Marie G.
 Sandsmark, Lois
 Chapman, Myrtle R.
 Hoyt, Marilyn
 Barrox, Ida M.
 Alvarez, Bonnie
 Mashar, Jeanne
 Kidder, Mary
 Bremer, Barbara
 Wang, Lucy C.
 Little, Evelyn M.
 Ng, Kay T.
 Fuentes, Jeanne M.
 Mull, Marilyn J.
 Corsi, Norine
 Tarleton, Letha

East Ave.
 Eden Gard.
 Eldridge

Harder

Highland
 Kimball

Laurel

Longwood
 Lorin Eden

Russ Elem
 Schafer Park

Shepherd Elem
 Southgate
 Treeview

Winton Grove**Livermore Val. Jt. Unif.**

Almond Ave.
 Emma Smith
 Fifth St.
 Green
 Jackson Ave.
 Michell Elem.
 Sonoma

Sorensen, Olive
 Cosby, Connie
 Larsen, Helen Y.
 Mitchell, Mildred M.
 Kashiwamura, James S.
 Clark, Ronald D.
 Knott, Erna

Murray Elementary**Murray Elem**

Hinton, Michael
 Hsu, Shirley

Newark Unified**A. L. Schilling**

Curtiss, Georgia
 Grissom, Carmen
 Williams, Sally A. Metz
 Weber, Mary
 Paulson, Peggy J.
 Kewlinson, Milena
 Shelley, Mary T.
 Swithenbank, Iia
 Rankin, Laura
 Cook, Florence
 Meagher, Patricia

E.L. Musick

H.A. Snow
 J. Bunker

Lincoln
 Miami, L.

New Haven Unified

Searls
 White

Medeiros, Kalie
 Safer, Lola

School District

School

Participant

Oakland Unified

Chabot
Garfield Elem
Hillcrest
Lafayette

Shaw, Mary E.
Jones, Joyce C.
Smith, Robert L.
Perry, Ardath
Savelle, Julia A.
Harrison, Bonnie J.
Walden, Margit
Zoslosky, Anastasia
Williams, Robert L.
Cunliffe, Dorothy E

J. Miller

Munck
Santa Fe
Sequoia

Pleasanton Jt. Elem.

Alisal

Garibaldi, Ralph H.
Ingham, Thomas L.
Warren, Delton E.

San Leandro Unified

Garfield

Allen, Joan
Rearden, Alma M.
Nardine, Henry
Muir, Betty
Clark, Barbara
Bramsman, Victoria L.
Jaeger, Joyce M.

Madison
Roosevelt
Washington
Wilson

San Lorenzo Unified

Colonial Acres
Dayton
Del Rey
Lorenzo Manor

Willson, Robert I.
Lee, Elizabeth Y.
Marciel, Doris A.
Grundel, Carmelina

ALPINE COUNTY

Alpine County Unified

Bear Val. Elem.

Huberty, Alice T.

AMADOR COUNTY

Jackson Unified

Jackson Elem

Davis, Donna M.

Oro Madre Unified

Sutter Cr. Elem.

Wallace, Mary L.

BUTTE COUNTY

Chico Unified

McManus
Neal Dow

Murray, Francis
Richhart, Geraldine

Paradise Unified

Ponderosa

Plumb, Lucille

CONTRA COSTA COUNTY

Antioch Unified

Bidwell
Fremont

Winniford, Marie
Winquist, Nabel G.

<u>School District</u>	<u>School</u>	<u>Participant</u>
Antioch Unified (Cont'd.)	Kimball Turner	Wilkinson, Stephen F. Morgan, Marilyn J.
Byron Union Elementary	Byron	Skoglund, Neva G.
Lafayette Elementary	Happy Valley Springhill	Steel, Kathryn L. Castner, William E.
Martinez Unified	John Swett	Sedgwick, Gerald H.
Moraga Elementary	Los Perales	Dean, Kenneth M.
Mt. Diablo Unified	Cambridge Crawford El Monte Larkey Monte Gardens Valhalla Ygnacio Val	Herr, Michael A. Wong, Sheryl McCormick, Cecile Millen, Dorothy J. Fleming, Ida J. Lederer, Betty J. Swain, Jeanene Kann, Pearl Muller, Milo Holmberg, Verda F.
Oroinda Union	Glorietta	Goffey, Margaret
Richmond Unified	Bayview Collins	Redick, Sarah Brown, Norma J.
<u>DEL NORTE COUNTY</u>		
Del Norte County Unified	Crescent Elk	Kincaid, Mary S.
<u>EL DORADO COUNTY</u>		
Camino Union Elementary	Camino Union	McGlothen, Raymond C. Sydnor, Darlean
Northside Union Elementary	Northside	Block, Gerald
Rescue Union	Jackson	Ford, Irene Pos, Myrtle M.
<u>FRESNO COUNTY</u>		
Auberry Union	Auberry Union	Rempel, Evalene E.
Clovis Unified	Cole Elem	Schumacher, Edith
Fowler Unified	Malaga Elem	Benson, Harold E.

<u>School District</u>	<u>School</u>	<u>Participant</u>
Fresno City Unified	Addams	Dupzyk, Norma P. Watson, Billy B.
	Baird	Meredith, Grace M. Oja, Lydia
	Calwa	Harvill, Sydney
	Centennial	Varnell, Virla
	Dailey	Reiss, Bonnie
	Easterby	Carpenter, Francelia
	Ericson	Putlor, William
	Figarden	Richner, Robert D.
	Franklin	Urbanes, Ella B.
	Fremont	Morton, Ann T.
	Holland	White, Margot
	Homan	Schulmeister, Nancy J.
	Kirk	Allen, Miriam F.
	Kratt	Hinkly, Marjorie M.
	Lafayette	Nunex, Maria
	Lincoln	Hubbart, Jeannette B.
	Lowell	Fritz, Carrol G. Towne, Frances G.
	Malloch	Teichman, Helen
	Norseman	Webster, Elsie
	Robinson	Person, Lorraine
Vinland	Maddux, Edna Mosley, Nellie S. Swan, Kay E.	
Selma Unified	Wishon	Hess, Cecile M.
	Wolters	Allard, Kathryn Byrnes, Florence Callahan, Jane Ruether, Beatrice
<u>GLENN COUNTY</u>		
Hamilton Union	Hamilton	Savin, Esther M. Wion, Gloria J.
Willows Unified	Murdock	Flocher, Esther L.
<u>IMPERIAL COUNTY</u>		
Calxico Unified	Jefferson	Davis, Janet Hamby, William F.
	Rockwood	Person, Sylvia E.
<u>INYO COUNTY</u>		
Bishop Union Elementary	Home Street	Smith, Floyd B.

<u>School District</u>	<u>School</u>	<u>Participant</u>
<u>KERN COUNTY</u>		
Arvin Union	Sierra Vista	Drake, Sandra L.
Bakersfield City	Castro Lane	Boudreaux, Claude Francis
	Baker	Brewer, Virginia
	Eissler	Pan, Eunice
	Harris	Londquist, Donald J.
	Longfellow	Goossen, Chloe J. Jacobs, Margaret M.
China Lake	Dessert Park Groves	Casados, Yolanda Bjorklund, Elizabeth
	Richmond	Bruce, Wallace P. Mayne, Evelyn M.
		Bruce, Doris M.
Delano Union	Cecil Ave. Fremont	Dawson, Eva Duke, Vernon
	Terrace	Butler, Mary C. Glover, Eleanor H.
Greenfield Union	Fairview	Edmondson, Janis Lanier, Glenda A.
	Plantation	Villanueva, Theresa M. Hoskins, Helen
Lamont Elementary	Alicante	Belt, Wilma
<u>KINGS COUNTY</u>		
Central Union Elementary	Central Union	Yenger, Katherine A.
Lemoore Elementary Union	Meadow Lane	Pope, Fred
Reef-Sunset Union	Avenal	Hodges, Ray
<u>LAKE COUNTY</u>		
Konocti Unified	East Lake	Bowers, Melvyn K.
<u>LASSEN COUNTY</u>		
Susanville Elementary	McKinley	Cook, Charlene S.
<u>LOS ANGELES COUNTY</u>		
ABC Unified	Kennedy	Newkirk, Judith

<u>School District</u>	<u>School</u>	<u>Participant</u>
ABC Unified (Cont'd)	Palms	Punt, Joyce Hoover, Gloria
Arcadia Unified	Baldwin Stocker	Weber, Robert
Azusa Unified	Charles Lee	Heckman, Gary
Baldwin Park Unified	Central Foster Geddes Kenmore Tracy Walnut	Palacios, Sheilah Lane, Prudence Mussack, Evelyn E. Kaden, Rudolph Jr. Havens, Marie Emmons, Beverly Ann Gerard, Bryson H.
Bassett Unified	Tonopah	Berry, Betty Kaenel, David G.
Bellflower Unified	Ernie Pyle Jefferson	Schumock, Fred R. Campbell, Edith M.
Beverly Hills Unified	Horace Mann	Kades, Norman J.
Bonita Unified	Gladstone	Lambert, Joseph S. Chapman, Pattee
Charter Oak Unified	Glen Oak Palm View Willow	Marr, Jerold B. Marcarello, Teresa Fletcher, John E.
Compton City	Bursch Colin Kelly Dickison Tibby	Ford, Amelia Smith, Nettie B. Alexander, Glenn L. Olson, Maralyn Schock, Dolores
Covina Valley Unified	Ben Lomond Covina Elem Grovecenter Valencia	Betts, Mavis Lipscomb, Eleanor L. Fox, Sandra S. Thorson, Beverly E. Davenport, Loreta
Culver City Unified	El Marino Washington	Krasno, Marian R. Weber, Marie Richardson, Mary L.
Downey Unified	Alameda Ed Lewis Encho Snta Gert.	Ybarra, Diane E. Wagner, Luella A. Boisvert, Paul G.
Duarte Unified	Maxwell	Dubois, Barbara Proud, B. Warren

<u>School District</u>	<u>School</u>	<u>Participant</u>
East Whittier City	Ceres	Lannon, Ruth McClintock, Phyllis
	C.T.Samuels	Francks, Evelyn
	Laurel	Bradford, Susanne V.
	Mulberry	Apodaca, Helen C.
	Murphy Ranch	Cram, Zus N. Mullen, Doris G.
El Rancho Unified	Orchard Dale	Smith, Emma M.
	Valley View	Olson, Gladys
	Obregon	Stilwell, LaVaughn R.
	Maiseland	Gilpin, Evelyn
	L. T. Magee	Reed, Jerry R. Swardlow, Evelyn
Enterprise City	Valencia	Caylor, Dorothea Orr, Carol
	Mark Twain	Campbell, Leola McCaleb, Goldie B.
Gervey	McKinley	McClure, Lou S.
	Fern	Dugdale, James B.
Glendora Unified	La Petra	Weite, B. R.
	Roosevelt	Schoolmaster, Joan
	Sellers	Booth, Fonda D.
	Sutherland	Rector, Margaret M.
Hudson	Dibble	Cantu, Ernest
	Grazide	Steig, Joyce
	Hudson	Hatch, Alice M.
	Los Molinos	Rains, Clara B.
	Temple	Kohlstedt, Roger
Inglewood Unified	Center Park	Erznosnik, Marie P.
Keppel Union	Alpine	Patton, Lois
Las Virgenes Unified	Antelope	Persons, Gene
	A.E. Wright	Kim, Susan H.
Lennox	Round Meadow	Haugan, Barbara J. Hedrick, Mary L.
	Buford	Howell, Alice A.B.
Long Beach Unified	Jefferson	Deitch, Donald I.
	Larch	Sandoval, Oliver Z. Todd, Margo M.
	Addams	Anderson, Dorothy M.
Barton		Culler, Hazel J.
		Kompleski, Myrtle Wharton, Diane

<u>School District</u>	<u>School</u>	<u>Participant</u>	
Long Beach Unif. (Cont'd.)	Birney	Probasco, Lila R. Sturgeon, George F.	
	Bixby	Phillips, Hazel	
	College Inter.	Sturiale, Frank	
	Cubberley	Eipper, Irma McFarling, Velma L.	
	Field	Adwan, Nancy H.	
	Gant	Whitman, Josephine M.	
	Garfield	Ling, Eva M.	
	Grant	Corrigan, Bernice B.	
	Harte	Johns, Ada L.	
	Longfellow	Barr, Janis	
	Lowell	Sirotnak, Gloria F.	
	Newcomb	Clepper, Linda	
	Riley	Pendleton, Joyce L.	
	Roosevelt	Williams, Louise E.	
	Sutter	Caddick, Judith	
	Twain	Hutton, Thelma B.	
	Los Angeles Unified	Ascot Ave.	Austin, Ernestine C. Straw, Carolyn L.
		Bassett	Cooper, Annlee
		Beachy Ave.	Mayrals, Jean B.
Budlong Ave.		Brock, Janet M.	
Bushnell Way		Gaivin, Thomas L.	
Calvert St.		Bradley, Mary K.	
Carson St.		Rebolt, Barbara B. Bryan, Dorothy I.	
Castelar		Cohen, Susan Walter, Patricia S.	
Collier St.		Bradley, Daniel W.	
Cohasset St.		Chase, Nettie	
Dahlia Heights		Overlock, Marie S. Eskin, Anne B.	
Del Amo		Warner, Hollis E.	
Devonshire		Wormell, Lynda S.	
El Dorado		Bruhn, Donna C. Knepp, Mary E.	
Euclid Ave.		Isumoto, Sandra J.	
54th Street		Williams, Esther	
Gledhill		Kent, Beatrice Hopkins, Jane W.	
Graham Elem		Morgan, Ellen Holman, Edna L. Mack, Marvelous O. Morgan, Ruby M. Payton, Chariye W.	
Grant Elem		Saund, Marian	
Griffin Ave.		Brown, Clayton T. Jr.	
Hadden Ave.		Gallup, Virginia F. Samoss, Carol W.	
Hawaiian Elem		Neff, Ruby K.	
Hobart Elem		Bergen, Libby R.	

<u>School District</u>	<u>School</u>	<u>Participant</u>
Los Angeles Unified (Cont'd.)	Lassen	Griffith, Alice H.
	Lamy	Roland, Bernice
	Limerick Ave.	Takahashi, Charlotte
	Loreto St.	Throne, Ruth S.
	Loyola Village	Cantwell, Aileen M.
	Marianna Ave.	Dorn, Allie L.
	Menlo Ave.	McDonald, Constance K.
		Wallace, Lynn
	Miles Ave.	Leung, Mei L.
	93rd St.	Lorack, Ella M.
	Prairie St.	Horwitz, Sonya
	Purche Ave.	Hall, Betty A.
	Raymond Ave.	Davis, Irma W.
	Rio Vista	Weiss, Hilda L.
	Rosemont Ave.	Miller, Wilma F.
	Russell Elem	Lewis, Archie T.
	San Pascual Ave.	Cheek, Letitia H.
	75th Street	Wells, Carolyn R.
	74th Street	Bosse, Barbara J.
	Wadsworth	Washington, Joan
	Western Ave.	Moore, Esther B.
	Wilmington Pk.	Lambertson, Blanche H.
	Winnetka Ave.	Duga, Sharon
	Tucker, Coralee	
	Rangel, Doris	
	Bartoline, Wendy V.	
	Osborne, Evelyn E.	
	Remy, Dorothy S.	
	Wetterau, Joyce D.	
	Smith, Patricia K.	
	Roberts, Janine D.	
	Freeman, Gwendolyn P.	
	Wade, Allura F.	
	Wilson, Edna D.	
	Williams, Cheryl A.	
		Wilkes, Joan B.
		Smith, Lynn A.
		Hodel, Hazel M.
Los Nietos Elementary	Ada Nelson	
	Aeolian	
	Echo S Gertrudes	
Loweli Joint	Olita	Schwantz, Mollie
Lynwood Unified	Lincoln	Blinder, Ruth
	Roosevelt	Berhendt, Marilyn
Manhattan Beach City	Robinson	Barrett, Patricia L.
	Pacific	Bower, Jeannette W.
Monrovia Unified	Mayflower	Knaggs, Kathryn L.
	Plymouth	Stert, Betty J.

<u>School District</u>	<u>School</u>	<u>Participant</u>	
Montebello Unified	Greenwood	Santilli, Virginia M. Scott, Joann	
Mountain View	Baker	Ishizu, Fuji Nobui, Leatrice K.	
	Cogswell	Gurule, Laureen L.	
	La Primaria	Ralston, Nancy R.	
	Linda Vista	Yamamoto, Betty H.	
	Maxson	Kupper, Barbara Scanlon, Katherine	
	Monte Vista	Mahn, Doris McHenry, Maudie M.	
	Parkview	Smith, Lewis M.	
	W. Payne	Wimberly, Ronna M. Dipeso, James C.	
	Norwalk-LaMirada	Anthony	Shaw, Sybil
		Dolland	Zdeb, Merrie Ann Hogrefe, Kathy Dakan, Janet R. Wright, Ruby
Dulles		Grosfeld, Kathy Orr, Willis	
Eastwood		Byrne, Michael Stalman, Carol A. Smith, Mary Ann	
Escalona		Anderson, Sophie Brown, Sharon	
Foster Road		Golding, Nelda Haake, Shirley Sampson, Michael McDonald, Gertrude	
Gardenhill		Hively, John A. Schneringer, Martha	
Glasier		Kato, Jean Kusumoto, Frances	
Grayland		Bilby, Ethel Kelly, Carol Wolfe, John	
Hargitt		Dunn, Johnnie Kimura, Jo A.	
Hoxie Ave.		Lachance, Susan Stanley, Diane	
Hutchinson		Iwasaki, Barbara Morris, Karen	
Johnston		Allen, Delores Baldrige, Linda Sayles, Daisy Walker, Lowell	
Kling		Chase, Grace Teramoto, Lorraine	

<u>School District</u>	<u>School</u>	<u>Participant</u>	
Norwalk-LaMirada (Cont'd.)	Lampton	Drake, Mary Cole, Frances Combes, Joyce	
	La Pluma	Daggett, Rod Marcum, Norinne Robinson, Dwayne	
	Mesa	Gilinsky, Leona Roberts, Joanne Vihlen, Jean	
	Moffitt	Perry, Janice Uemura, Aileen	
	Morrison	Barnhart, Jane McLelland, Gladys	
	New River	Altmann, Ann Lopez, Bill Goenne, Jeronina M.	
	Nottingham	Ollmann, Evelyn Tong, Jerry	
	Nuffer	Gurule, Carol Lewis, Lois	
	Ramona	Gambill, Marty Watson, Ruth	
	Rancho Waite	Mendenhall, Wilma Bard, John Paris, Virgene Stephens, Georgia	
	Palmdale Elementary	Yucca	Boyd, E. Diane
	Palos Verdes Peninsula Unif.	Ladera Linda Montemalaga Pedregal Vista Grande	Guerrero, Joan Gump, Marion Koniccy, Suzanne S. Bauer, Sally K.
	Pasadena Unified	Audubon Don Benito	Spina, Frederick Bowman, Gregory
Pomona Unified	Harrison Kellogg Westmont Yorba	Rumph, Florence Snyder, John L. Ronspert, Lisabeth Loomis, Alden	
Redondo Beach City	Birney Cleveland Jefferson Madison Scuth Washington	Kuhn, Beth I. Dodge, Avis Bishop, Gail E. Radcliff, Johnnie S. Kryet, Carol G. Conn, Sybil S. Ferguson, Jennie B.	
Rowland Elementary	Farjardo Hollingworth	Milligan, Patricia C. McCarville, Mary	

<u>School District</u>	<u>School</u>	<u>Participant</u>
Rowland Elementary (Cont'd.)	Hurley Killian Ybarra	St. John, Willard Nordquist, John M. Berns, Doris K. Schuricht, Paul W.
Temple City Unified	Cloverly Longden	Burwell, Leonard L. Gee, William Stover, Catherine S.
Walnut	Vejar Walnut Elem	Norris, Louise Lyons, Roberta
Willowbrook	Anderson Carver Lincoln King	Lewis, Harriette M. Walden, Jessie M. Jones, Annie H. Liberto, Margaret R. Armstrong, Lula M. Jordan, Helen E. Davis, Bertha K. Hill, D. Rhea Hughes, Ollie M.

MARIN COUNTY

Dixie Elementary	Dixie	Bernard, Gladys M. McCue, Margaret E.
Lagunitas Elementary	San Geronimo	Murphy, Margaret A.
Novato Unified	Hamilton Loma Verde Lu Sutton Marion	Wagner, Nedra J. Jones, Eleanor Sung, Joan S.K. Vestal, Ronald L. Zaro, Rita M.
Read Union	Bel Aire	Nata, Katrina B. Schindel, Cheryl Tanaka, Shirley N.
Ross Elementary	Ross Grammar	Hardy, Dorothy L.
San Anselmo Elementary	Brookside	Baker, Kerin A.
San Rafael City	Short	Petropoulos, Barbara
Sausalito Elementary	Central King	Edwards, Virginia G. Kelly, Ann Thurman, Barbara W. Kincaid, Kent Menaster, Ray

<u>School District</u>	<u>School</u>	<u>Participant</u>
<u>MENDOCINO COUNTY</u>		
Anderson Valley	Anderson Val.	Johnson, Lawrence X.
Arena Union Elementary	Areaa Elem	Rogers, Susan S.
Fort Bragg Unified	Dana Gray	Gjerde, Marion
Willits Unified	Brookside	Kennedy, Evelyn
<u>MERCED COUNTY</u>		
Atwater Elementary	Shaffer	Delacruz, Gretchen K.
Ballico-Cressey Elementary	Cressey	Doolin, Emily
Dos Palos Joint Union Elem	Dos Palos	Green, Juanita Souther, Elizabeth H.
Hilmar Unified	Elia	Grant, John R.
Le Grand Union Elem	Le Grand	Whitmore, Irene L.
Merced City Elem	C. Wright Franklin	Furtado, Marceline W. McLean, Betty H.
Winton Elementary	Winton	Mello, Peggy P.
<u>NAPA COUNTY</u>		
Napa Valley Unified	Lincoln Elem Snow Vichy Elem West Park	Frazier, Kathryn Stevenson, Martha D. Kulas, Suzanne Peters, Mary M. Honodel, Deloris C.
<u>NEVADA COUNTY</u>		
Grass Valley Elementary	Hennessy	Hale, Dan
<u>ORANGE COUNTY</u>		
Anaheim City Elementary	Juarez Loara Elem	Olson, Elizabeth Liles, Carol J.
Capistrano Unified	R.H. Dana	Frankovic, Sharyn K.
Centralia Elementary	Danbrook	Broberg, Theodore C.

<u>School District</u>	<u>School</u>	<u>Participant</u>
Fullerton Elementary	Acacia	Wise, Margaret R. Yee, Lydia
	Commonwealth	Bohannon, Wilma J. Peterson, Claudine R.
	Golden Hill	Kreutzer, Dorothy
	Maple	Rupe, Anne
	Sunset Lane Woodcrest	Kantner, George H. Coons, Keith R. Huestis, Phyllis A.
Garden Grove Unified	E.M. Evans	Halsey, Kathleen M.
Magnolia Elementary	E.L. Walter	Blackwell, Claudia E.
Ocean View Elementary	Haven View Larkview	DeFrank, Jeralynn J. Tomei, Cherub A.
Orange Unified	Crescent	Nicholson, Dorothy J.
	Fletcher Elem	Fritts, Evanita P.
	Handy Elem	Stoddard, Carol A.
	Serrano	Dennis, Eloise B.
Tustin Elementary	Nelson	Kelley, Lorna Myers, Lolly
Westminster Elementary	John Land Ray Schmitt	Rice, Ronald W. Meinecke, Kathleen
<u>PLACER COUNTY</u>		
Placer Hills Elementary	Placer Hills	Foster, P. Jane Smith, Carol
<u>PLUMAS COUNTY</u>		
Plumas Unified	Greenville Quincy Elem	Kurtz, J. Cornell Bequette, Billie E. Rolloff, Richard A. White, Karen L.
<u>RIVERSIDE COUNTY</u>		
Banning Unified	Central Hammerling	Hurley, Andrew Aguirre, Sibyl B.
Corona Unified	Parkridge	Vanzee, Genora M.
Desert Sands Unified	Roosevelt	Turpin, Doris

School District**School****Participant****Hemet Unified****Hemet Elem
Ramona Elem****Goff, Billie A.
Richter, Jean****Jurupa Unified****Pacific Ave.
Pedley
W. Riverside****Hardin, Ollen B.
Culling, Lila
Sexton, R. Clifford
Center, Thelma M.****Palo Verde Unified****Ruth Brown****Parker, Sibyl W.****Val Verde Elementary****Val Verde****Curtis, Barbara Ann****SACRAMENTO COUNTY****Center Joint Elementary****Spinelli
Center Joint****Chase, Fay E.
Schwartz, Marjorie****Del Paso Heights****Fairbanks
Garden Valley****Rivenbark, Joan
Nugent, Robert L.****Elk Grove Unified****McKee Elem****Horigan, Carmel****Folsom-Cordova Unified****Williamson****Harbert, Bessie D.****Galt Joint Elem****Fairsite****Evans, Elvera L.
Ford, Jennie F.****North Sacramento Elementary****Gardenland****Weygandt, Cleo****Rio Linda Union****Holmes
Vineland****Kincaid, Jo C.
Hof, Marjorie****River Delta Unified****Iselton Elem****Ryon, Lulie****Robla Elementary****Taylor St.****Yamamoto, Helen K.****Sacramento City Unified****Birney
Donner Elem
Kemble Elem
Harkness
J. Bidwell

Cabrillo
Nicholas Elem
O.W. Erlewine
Pacific****McFarland, Margaret
Kriege, Dorothy
Wilson, Helen M.
Sweeney, Catherine N.
Holland, Dolores
McLaughlin, Doris J.
Missig, Donald H.
Stadler, Dorothy
Park, Beverly W.
Shingleton, Mary A.
McShane, Sharon R.
Nultgren, Lorna****San Juan Unified****Greer
Mitchell****Caylor, Ruth C.
Grendon, Jeannette M.**

<u>School District</u>	<u>School</u>	<u>Participant</u>
<u>SAN BENITO COUNTY</u>		
Hollister Elementary	Fremont	Aubin, Bryan
<u>SAN BERNARDINO COUNTY</u>		
Alta Loma Elementary	Alta Loma	Nilsen, Robert K.
Barstow Unified	Cameron Elem	Merchant, Thomas L.
Hesperia Elementary	Joshua Circle	Gay, J. Murray
Morongo Unified	Yucca Valley	Nickell, Gienna
Ontario-Montclair Elem	Monte Vista	Lowry, Frances D.
San Bernardino City	Eliot Elem	Burns, John M.
Trona Joint Unified	Trona Elem	Smith, Maxine O.
Victor Elementary	Del Rey Village	Mitchell, Edolene Coinson, Lillian C.
<u>SAN DIEGO COUNTY</u>		
Cajon Valley City Elementary	Bostonia Cuyamaca Lexington	Olden, Mary E. Senior, Ann E. Ruck, Nancy White, Marjorie
Cardiff Elementary	Cardiff	Eisfeld, Mardelle B.
Carlsbad Union Elementary	Buena Vista	Black, Lillie M. Clifton, Helen
Chula Vista City	Rohr Cook Rice Loma Verde Finney Rosebank Silver Wing Sunnyside Valle Lindc	Kennedy, Stella Barr, Dora Roise, Mary Linton, Dolores L. Squibb, Dwight R. Capps, Charlotte F. Bjornstad, George O. Hess, Agnes B. Coleman, Kathryn Avery, Ruby D. Seiler, Barbara H. Engberg, Sherry Kruetzfeldt, Mary L.
Encinitas Union	Capri	Staley, Helen M.

<u>School District</u>	<u>School</u>	<u>Participant</u>
Escondido Union	Conway	Dennison, Eileen M.
Fallbrook Union	Iowa Street Ellis Elem Ellis Pri	Voorhis, James W. Dornon, Don R. Earls, Madge C.
	Pendleton	Kinsey, Catherine Brannan, Gene D.
Lakeside Union	Lakeside Farms	Kime, Susan
	Lindo Park	Mundy, Priscilla
	Riverview	Lewis, Geanell Shears, Vernon V.
LaMesa-Spring Valley	Kempton La Mesa Elem	Claridge, Deva R. Arnold, Judy
	Northmont Rancho Elem	Kemper, Helena K. Rosenberg, Raymond
	Spring Valley	Crane, E. L. Lyons, Grace M. Happel, Katherine K.
Lemon Grove Elementary	Golden Ave. Vista La Mesa	Purves, T. Rolland Wittrock, Joan
National Elementary	El Toyon	Knapp, Luella P.
Oceanside Union Elementary	Mission San Luis Rey San Rafael Santa Margarita	Dorrell, Margaret Edwards, Gladys Henry, Sylvia Carson, Patricia E.
Orange Glen Elementary	Orange Glen	Wicklund, Donald E. Harden, James L.
Ramona Unified	Ramona Elem	Boyle, Rose M.
Rancho Santa Fe Elementary	Rancho Santa Fe	Cook, John E. Spivey, William B. Taylor, William M.
San Diego Unified	Angier Barnard Beale Birney Carson Dewey Farnum Florence McKinley Elem Hardy Elem	Mills, Joseph M. White, Frances W. Whipple, Alfred H. Jr. Fadem, Phyllis R. Fintel, Fay A. Toyen, Marsha S. Whitten, Elwanda K. Sypher, Diane Gladden, Edith C. Atkinson, Elizabeth T. Shriver, Francis J.
	Hearst	Richmond, Beverly

<u>School District</u>	<u>School</u>	<u>Participant</u>
San Diego Unified (Cont'd.)	Lafayette	Williams, Gertrude F.
	Longfellow	Jackson, Donna
Santee Elementary	Muir	Moraros, George N.
	Stockton	Ryan, Judith A.
	Wiggin	Stebbins, Beverly J.
		Greene, Hazel L.
Santee Elementary	Carlton Hills	Souviney, Randall J.
	Harritt	Mathew, Mary Raddatz
	Santee	Sesler, Sandra A.
San Ysidro Elementary		Richardson, Judith G.
		Trousdale, Elta S.
San Ysidro Elementary	Beyer	Martin, Alexander
	Sunset	Russell, Geraldine K.
South Bay Union Elementary	Imperial Beach	Pryor, Thelma G.
	Sunnyslope	Kijanka, Bogdan F.
Vista City Unified	Olive	Collins, Billee A.
		Mohr, Margaret R.

SAN FRANCISCO COUNTY

San Francisco Unified	Fremont	Higgins, Joan C.
	Grant	Brown, Connie
	Junipero Serra	Allen, Ella
	Kate Kennedy	Pengra, Nanci R.
	McKinley	Louie, Samuel
	Lawton	Omatsu, Ruth S.
	Paul Revere	Hill, Nelva
	Twin Peaks	Wooster, Joyce S.
		Epstein, Richard

SAN JOAQUIN COUNTY

Lincoln Unified	Williams	Willems, Edwin
Lodi Unified	Lakewood	Fields, June
Ripon Unified	River	Watters, Marion L.
Stockton Unified	Fillmore	Tom, Raymond
	Garfield	Domer, Barry W.
		Lina, William E.
	Jackson	Brown, Evelyn F.
	Roosevelt	Sturmer, Lucile A.
Taylor		O'Brien, Stephen T.

<u>School District</u>	<u>School</u>	<u>Participant</u>
<u>SAN LUIS OBISPO COUNTY</u>		
Paso Robles Union Elementary	Georgia Brown	Smith, Harold G.
<u>SAN MATEO COUNTY</u>		
Cabrillo Unified	Half Moon Bay	Kinsley, Leslie
Las Lomitas Elementary	La Loma	Leuthauser, Dean
Portola Valley Elementary	Corte Madera	Costello, Kathieen
San Carlos Elementary	Brittan Acres Heather White Oaks	Mitchell, William R. Garcia, Florinda Scarfo, Elizabeth
San Mateo City Elementary	A.H. Horrall Audubon Elem Foster City San Mateo Knolls Lakeshore Park	Schwerin, Stanley J. Mott, Gregory E. Murrock, Caroline Farrington, Marcella Heagerty, Anita Mellish, Leana F. Diskin, Marjorie
<u>SANTA BARBARA COUNTY</u>		
Goleta Union	Fairview	Morey, Susie
Lompoc Unified	Clarence Ruth Los Padres	George, Phyllis Eatmon, Richard Bigotti, Lauren L.
Orcutt Union Elementary	Orcutt	Younglove, Hugh
Santa Barbara City	Adams	Marr, Charles A.
Santa Maria Elementary	Rice Tunnell	Lettau, John H. Wimer, Janice L.
Solvang Elementary	Solvang	Long, William D.
<u>SANTA CLARA COUNTY</u>		
Alma Rock Union Elementary	Mayfair Hubbard	Jordan, Bernice B. Campbell, Sylvia S.
Campbell Union Elementary	Parkway Quito San Tomas	Carlossi, Peter J. Goth, James E. Steiner, F. Robert

<u>School District</u>	<u>School</u>	<u>Participant</u>
Cupertino Union Elementary	Nimitz Stevens Creek	Brittain, Barbara W. Reiber, Mary L.
Evergreen Elementary	Cadwallader Whaley	Goerts, Minnie C. Mangold, Jane E. Arneson, Margaret A.
Franklin-McKinley Elementary	Hellyer Hillsdale Kennedy Los Arboles McKinley Santee Seven Trees	Kilgore, Claudia J. Morrissey, Mary Bridges, Marilyn Dickerson, Jacqueline Mackie, Aileen Vaughan, Jean T. Spalding, Quida K. Herrington, Kathleen Hovey, Caria R. Meadows, Jeanne R. Persson, Lester C.
Loma Prieta	Loma Prieta	Seaman, Sarah
Los Gatos Union Elementary	Berry Lexington	Ng, Elsie E. Clinton, Shirley A. Miller, Marion M.
Moreland Elementary	Country Lane	Williamson, Richard
San Jose Unified	Darling Cory Empire Gardens Gardner Henderson Hester Jefferson Merritt Trace Reed Schallenberger Simonds Valley View Williams	Norman, Ella F. Terril, Consuelo C. Lewis, Robert Bank, Rachel Corrigan, Verna Jernigan, Joan Strong, Beverley J. Stege, Judith A. Thompson, Ina Gray, Mary H. Wright, Frances W. Schag, William C. Blakeney, Shirley Werner, Charlene Long, Eva M. Giddings, Dorothy Riebhoff, Constance M. Addington, Rebecca S. Holmes, Kenneth E. Lloyd, Frances E. MacDiarmid, Barbara
Santa Clara Unified	Brucher	Emfinger, Diane Hicks, Geraldine Pazemenas, Nancy

<u>School District</u>	<u>School</u>	<u>Participant</u>
Santa Clara Unified (Cont'd.)	Laurelwood Washington	Wilson, Robert G. Carlson, Gays
Saratoga Union Elementary	Argonaut Saratoga	Kossen, Florence G. Kossen, Mary
Sunnyvale Elementary	Ellis	Semas, Merry A.
<u>SANTA CRUZ COUNTY</u>		
Soquel Union Elementary	Capitola	King, Mary
<u>SHASTA COUNTY</u>		
Cascade Union Elementary	Verde Vale	Burket, Duane
Enterprise Elementary	Rother	Wall, Judith L.
Shasta Lake Union	Deer Creek	Lott, Martin D.
<u>SIERRA COUNTY</u>		
Sierra-Plumas Joint Union	Loyalton Pri	Bearden, Judith B.
<u>SISKIYOU COUNTY</u>		
Etna Union Elementary	Etna Union	Prestegard, Roger B.
Happy Camp Union Elem.	Happy Camp	Long, Richard A.
<u>SOLANO COUNTY</u>		
Fairfield-Suisun Joint Unif.	Richardson	Nesbitt, Bernice Rodwell, Mrs. Leonard
Travis Unified	Center	Hunter, Carolgene Maddox, Velma R.
Vacaville Unified	Monte Vista Ulatis	Pryor, Margaret T. Walker, Elinor W.
Vallejo Unified	Steffan	Enea, Margaret
<u>SONOMA COUNTY</u>		
Bennett Valley Union	Bennett	Yount, Mira E.

School District

Healdsburg Union Elementary

Mark West Union

Rincon Valley Union

Sonoma Valley Unified

School

Fitch Mountain

Mark West

Matanzas

El Verano

Participant

Vasmatre, John R.

Brasier, Sharon W.

Sondergard, E. Clarice

McJimsey, Sandra E.

STANISLAUS COUNTY

Ceres Unified

Modesto City

Riverbank Elementary

Caswell
Don Pedro

Everett
Garrison

California
Cardozo

Farquhar, Virgil
Guthrie, Ayris

Brasch, Adolph E.
Brown, Marjorie J.

York, Suzanne I.
Nevins, Roy M.

SUTTER COUNTY

Pleasant Grove Jt. Unified

Pleasant Grove

Newton, John M.

TEHAMA COUNTY

Red Bluff Union

Jackson
Lincoln

Sanford, Ernest
VanVleet, Edward L.

TULARE COUNTY

Cutler-Orosi Unified

Earlimart Elementary

Lindsay Unified

Visalia Unified

El Monte
Yetter

Earlimart

Jefferson
Washington

Goshen
Washington

White, Cecil H.
White, Leona M.

Prophet, Leslie

Hughes, Carol L.
Webster, Phyllis

McFarland, Mary
Williamson, Alice G.

TUOLUMNE COUNTY

Summerville Elementary

Summerville

Pilaria, Beatrice

<u>School District</u>	<u>School</u>	<u>Participant</u>
<u>VENTURA COUNTY</u>		
Hueneme County	Williams	Lawler, Gladys Hughes, Gertrude J.
Pleasant Valley	Dos Caminos Las Posas	Leach, Kenneth C. Wiley, Fred L.
Timber Elementary	Manzanita Walnut	Vest, Paul R. Bullock, Meredith Rokke, David K.
Valley Oaks Union	Glenwood Horizon Hills Meadows Park Oaks	Bohanon, Robert J. Greenfield, Sylvia Marking, Dorothy M. Woodson, Patricia Eden, Barbara
Ventura Unified	Montalvo Mound	Pomatti, Delilah R. Peters, Ann M.
<u>YOLO COUNTY</u>		
Davis Joint Unified	North Davis Pioneer Valley Oak West Davis	Meyer, Carol J. Bailey, Irma L. Brakke, Mary McLester, Carol F. Cox, Ellen
Washington Unified	Norman Evergreen	Schaffer, Leone Westvik, Ardeene J.
<u>YUBA COUNTY</u>		
Marysville Joint Unified	Linda Covillaud	Daniels, Karin M. Pyncheon, Kathleen J.

APPENDIX D

MATERIALS USED AND/OR RETAINED BY PARTICIPANTS

Workshop Materials

Manipulative Mathematics Laboratory Materials

Motion Pictures

PRINTED MATERIALS

Houghton Mifflin Company
777 California Avenue
Palo Alto CA 94304

- 1-14307 Mod. Sch. Math Book, 2, Student
- 1-14330 Mod. Sch. Math Book, 2, Teacher
- 1-14320 Mod. Sch. Math Book, 5, Student
- 1-14333 Mod. Sch. Math Book, 5, Teacher
- 2-43725 Experiments in Mathematics, Stage 1
- 2-43729 Experiments in Mathematics, Stage 2
- 2-43733 Experiments in Mathematics, Stage 3

John Wiley and Sons, Inc.
605 Third Avenue
New York NY 10016

- I Do and I Understand
- Mathematics Begins, 1
- Computation and Structure, 2
- Computation and Structure, 3
- Beginnings, 1
- Shape and Size, 2
- Shape and Size, 3
- Pictorial Representations, 1

Webster Division
McGraw-Hill Book Company
8171 Redwood Highway
Novato CA 94947

- 18479 Attribute Games Manual
- 18480 Attribute Games Problem Cards
- 17524 Geo Block Manual
- 18417 Mirror Card Manual
- 17521 Peas and Particles
- 17560 Pattern Block Manual
- 17511 The Balance Book
- 61131 Operations Games Manual
- 18502 Attribute Game Stickers

	INVENTORY	ALL PARTICIPANTS	LEVEL I PARTICIPANTS	LEVEL I PRIMARY PARTICIPANTS	LEVEL II PARTICIPANTS	ALL LABS	LEVEL II LABS	ALL CLASSROOMS	LEVEL II, 5TH CLASSROOMS
\$ 3.60								X	
3.16								X	
3.80								X	
5.00								X	
1.20						X			
1.20						X			
1.20						X			
1.95								X-P	
2.25								X-P	
2.50								X-P	
2.25								X-P	
2.50								X-P	
2.50								X-P	
2.25								X-P	
2.25								X-P	
3.84		X							
5.40						X			
1.92						X			
2.82						X			
2.97						X			
2.00						X			
3.00						X			
5.00						X			
2.55						X			

PRINTED MATERIALS

National Council of Teachers of Mathematics
 1201 16 Street, N. W.
 Washington DC 20036

300-09248 Enrichment Math for the Grades
 300-09274 Topics in Mathematics

Selective Educational Equipment, Inc.
 Three Bridge Street
 Newton MA 02195

ENGMPS Mathematics in Primary Schools
 GNO893 Practical Maths Workcards

Silver Burdett Company
 435 Middlefield Road
 Palo Alto CA 94301

Experiences in Discovery, Level C
 Experiences in Discovery, Level D

Math Media Division
 I & M Associates
 Post Office Box 1107
 Danbury CT 06810

M111 Mathematics Using String

A. C. Vroman, Inc.
 67 South Pasadena Avenue
 Pasadena CA 91105

Probability for Primary Grades, Student
 Probability for Primary Grades, Teacher
 Probability for Intermediate Grades, Student
 Probability for Intermediate Grades, Teacher
 Franklin Books - Learning About Measurement
 Franklin Books - Learn to Fold, Fold to Learn

	INVENTORY	ALL PARTICIPANTS	LEVEL I PARTICIPANTS	LEVEL I, PRIMARY PARTICIPANTS	LEVEL II PARTICIPANTS	ALL LABS	LEVEL II LABS	ALL CLASSROOMS	LEVEL II, 5TH CLASSROOMS
\$ 4.00							X		
4.00							X		
2.00							X		
18.75						X			
.60						X			
.60						X			
1.00						X			
.50						X			
2.00						X			
1.00						X			
2.00						X			
3.09						X			
1.98						X			

PRINTED MATERIALS

A. C. Vroman, Inc. (cont.)

- Franklin Books - Mirror Magic
- Franklin Books - Paper and Pencil Geometry
- Franklin Books - Mathematics Around the Clock
- Franklin Books - Making and Using Graphs and Nomographs
- Franklin Books - Patterns and Puzzles in Math

Walker Publishing Company
720 Fifth Avenue
New York NY 10019

Inquiry Into Math Via the Geoboard
Geo Card Math Lab

Department of Education, San Diego County
6401 Linda Vista Road
San Diego CA 92111

- Strands Report, Part I
- Strands Report, Part II
- Los Angeles Madison Project Cards
- San Diego Geoboard Cards
- Madison Project Cards
- Primary Rulers
- Playskool Color Cubes Sheet
- Balance Lesson
- Beanstick Lesson
- Cuisenaire Lesson
- Block Sheet (8 1/2" x 13")
- Geoboard Book for Primary (Zimmerman)
- Dot Paper

Elementary Science Study
55 Chapel Street
Newton MA 02160

Making Maps

	INVENTORY	ALL PARTICIPANTS	LEVEL I PARTICIPANTS	LEVEL I, PRIMARY PARTICIPANTS	LEVEL II PARTICIPANTS	ALL LABS	LEVEL II LABS	ALL CLASSROOMS	LEVEL II, 5TH CLASSROOMS
\$ 2.34						X			
1.95						X			
2.55						X			
1.95						X			
2.55						X			
2.50			X						
6.95						X			
		X							
		X							
		X							
		X							
		X							
		X							
		X							
		X							
		X							
		X							
		X							
		X							
		X							
.50					X				

PRINTED MATERIALS

Elementary Science Study (cont.)

Optics \$ 1.00
 Outdoor Mapping 1.00
 Whistles and Strings 1.00

Learning Materials Division
 Responsive Environments Corporation
 200 Sylvan Avenue
 Englewood Cliffs NJ 07632

106-G-08 Alike/Unlike Books, Set 1 3.00
 107-G-08 Alike/Unlike Books, Set 2 3.00
 169-T-01 Fraction Dominoes 3.00
 170-T-01 Decimal Fraction Dominoes 3.00
 105-G-08 Shape Analysis Matching Game 3.00

St. Regis Paper Company
 Nifty Division
 Post Office Box 588
 Houston TX 77011

Graph Paper, 11"x 15", 1" Squares .59
 Graph Paper, 11"x 15", 1/2" Squares .59
 Graph Paper, 22"x 30", 1" Squares 1.95
 Graph Paper, 22"x 30", 1/2" Squares 1.95

% Sales Tax and Shipping Costs 5.00

INVENTORY	ALL PARTICIPANTS	LEVEL I PARTICIPANTS	LEVEL I, PRIMARY PARTICIPANTS	LEVEL II PARTICIPANTS	ALL LABS	LEVEL II LABS	ALL CLASSROOMS	LEVEL II, 5TH CLASSROOMS
					X			
					X			
					X			
					X			
					X			
					X			
					X			
							X	
							X	
							X	
							X	
	X							

NAME _____

SECTION _____

MANIPULATIVE AIDS

Cuisenaire Company of America, Inc.
12 Church Street
New Rochelle NY 10805

CX-3E Classroom Kit

\$ 2.48

Educational Teaching Aids Division
A. Daigger & Company, Inc.
159 West Kinzie Street
Chicago IL 60610

1500 ETA Discovery Blocks

12.00

Herder and Herder
232 Madison Avenue
New York NY 10016

Z80008 Multibase Arithmetic Blocks

99.00

Holt, Rinehart and Winston, Inc.
Box 34400, Crocker Park
San Francisco CA 94134

Developing Number Experiences, Kit A

24.00

Lakeshore Equipment Company
6036 Claremont Avenue
Oakland CA 94618

P302 Color Cubes

1.90

La Pine Scientific Company
920 Parker Street
Berkeley CA 94710

Z-5000 La Pine Sage Kit

8.95

INVENTORY	ALL PARTICIPANTS	LEVEL I PARTICIPANTS	LEVEL I, PRIMARY PARTICIPANTS	LEVEL II PARTICIPANTS	ALL LABS	LEVEL II LABS	ALL CLASSROOMS	LEVEL II, 5TH CLASSROOMS
	X							
					X			
					X			
					X			
					X			
					X			
					X			

MANIPULATIVE AIDS

La Pine Scientific Company (cont.)

Z-8863 Hexstat Probability Demonstrator and Teacher's Manual \$ 1.50
 Z-0346 Ohaus Student Balance 11.96
 13-96 Spring Scale 2.00
 (031)

Math Media Division
 H & M Associates
 Post Office Box 1107
 Danbury CT 06810

M100 Ascobloc 20.00
 M158 Map Measure and Compass 2.20
 M160 Madison Project - Independent Exploration Material 16.25

Webster Division
 McGraw-Hill Book Company
 8171 Redwood Highway
 Novato CA 94947

17523 Geo Blocks 29.50
 184184 Mirror Cards 10.80
 174458 Tangram Cards 4.20
 174466 Tangram Pieces 2.40
 51130 Operations Games 12.00
 798967 Attribute Games Materials 9.60

Pickett, Inc.
 436 East Gutierrez Street
 Santa Barbara CA 93102

N-901-ES Elementary Slide Rule 4.46

INVENTORY	ALL PARTICIPANTS	LEVEL I PARTICIPANTS	LEVEL I, PRIMARY PARTICIPANTS	LEVEL II PARTICIPANTS	ALL LABS	LEVEL II LABS	ALL CLASSROOMS	LEVEL II, 5TH CLASSROOMS
					X			
					X			
					X			
					X			
					X			
					X			
					X			
					X			
					X			
					X			
					X			
					X			
					X			
					X			
					X			
					X			

MANIPULATIVE AIDS

Selective Educational Equipment, Inc.
 Three Bridge Street
 Newton MA 02195

INV100a Balance with Clips \$ 6.75
 SEE001 SEE "Calculator" 1.40
 AGCK00 Attribute Games and Problems 8.60
 INV250 Clinometer 4.50
 GN1159 Geometric Dominoes 1.25
 ESA005 Geometric Matching 1.25
 GN1046 Geometric Shape Spotting 2.00
 TAPE03 Measuring Tape, 15m/50' 5.00
 MIRROR Unbreakable Mirror 3/1.25
 KPS001 Netting .10
 KPS002 Bucket .12
 KPS003 Balance Stand 1.10
 KPS004 Pegboard Beam .35
 FBCK00 Pattern Blocks 10.50
 HPR006 Primary Ruler .15
 HPY007 Primary Yardstick 1.25
 GN1318 Setsplay 3.00
 GN1158 Spot the Set 2.00
 ARN001 Trundle Wheel 4.50

Sigma Enterprises, Inc.
 Box 15485
 Denver CO 80215

G-1 Geosquare Classroom Kit 42.00

A. C. Vroman, Inc.
 367 South Pasadena Avenue
 Pasadena CA 91105

Spinners for Primary Grades 7.00
 Spinners for Intermediate Grades 7.00

INVENTORY	ALL PARTICIPANTS	LEVEL I PARTICIPANTS	LEVEL I, PRIMARY PARTICIPANTS	LEVEL II PARTICIPANTS	ALL LABS	LEVEL II LABS	ALL CLASSROOMS	LEVEL II, 5TH CLASSROOMS
					X-3			
					X			
					X			
					X			
					X			
					X			
					X			
					X-6			
					X			
					X			
					X			
					X-12			
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					X			
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	X							
					X			
					X			



MOTION PICTURES

Source

Film Title

Madison Project
918 Irving Avenue
Syracuse NY 13210

Banneker Postman Stories
Addition and Multiplication Using Plastic Washers
Guessing Functions
Introduction to Geometry via Nail Boards
Inservice Films, Numbers 1 - 10 (10 reels)

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Davidson Films
1757 Union Street
San Francisco CA 94123

Piaget Classification
Piaget Conservation

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Radim Films
220 West 42nd Street
New York NY 10036

I Do, I Understand

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Foundation Film Library
Brooklands House
Weybridge
Surrey, England

Maths Alive

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Specialized Teacher Project
State Education Building
721 Capitol Mall
Sacramento CA 95814

Toward Improving Computation, Numbers 1 - 10
(Dr. Robert Wirtz) (10 reels)